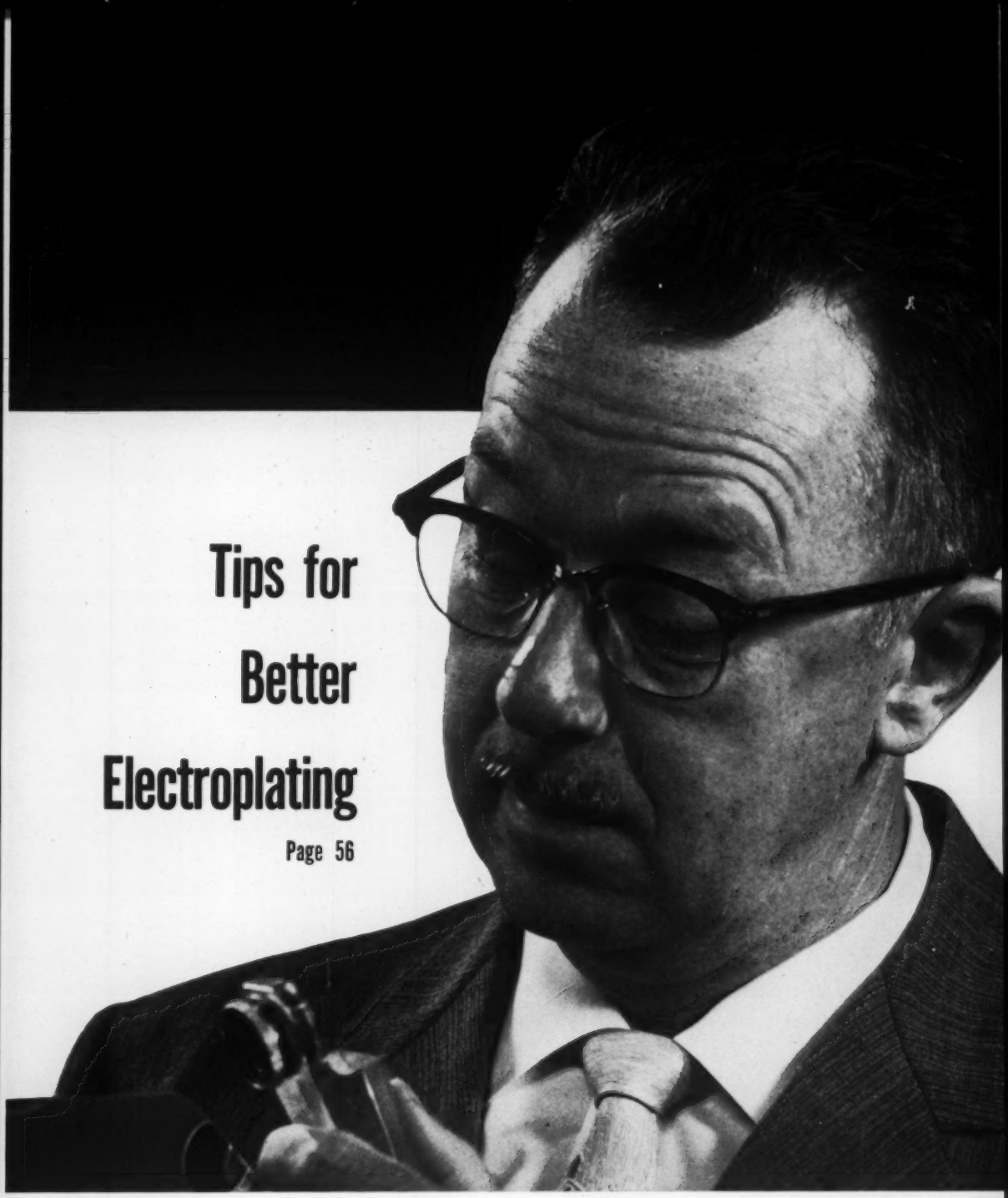
STEEL
The Metalworking Weekly
A PENTON PUBLICATION
JULY 31, 1961

Tips for Better Electroplating

Page 56



Battelle's C. L. Faust and teammates talk to both platers and users

How to Trim Your Shipping Costs 28

PROGRAM FOR MANAGEMENT

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Building Panels Take on New Luster . . . 90

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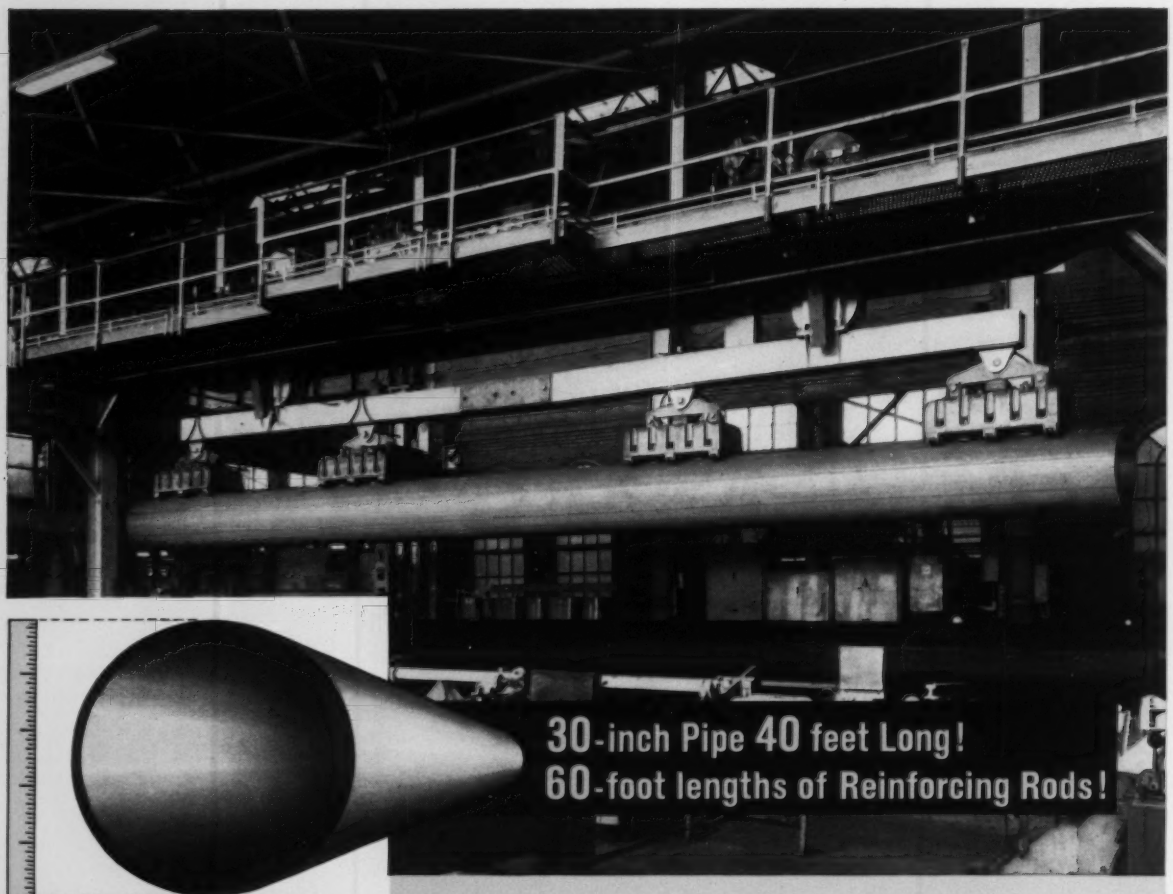

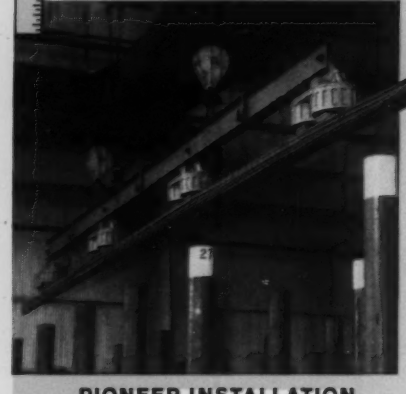

PIONEER INSTALLATION
Reinforcing rods, weighing up to 5 tons per bundle, are handled without slings ...without spacers between stored layers. EC&M magnets have narrow width to fit into production cradles and between storage rack posts.

ALL MOVED QUICKLY, SAFELY WITH EC&M MAGNETS!

At Bethlehem Steel Company's Line Pipe Mill in Steelton, Pa., pipe and rods are moved without chains, without slings, without ground men. The result—no bottlenecks!

For any handling requirement like this, EC&M has the right size and type of magnet. Let us prove that EC&M magnets can move your pipe and rods just as quickly, just as safely—and economically, too.

NEW BROCHURE 1311 fully describes these operations. Write for your copy. Square D Company, EC&M Division, 4500 Lee Road, Cleveland 28, Ohio.

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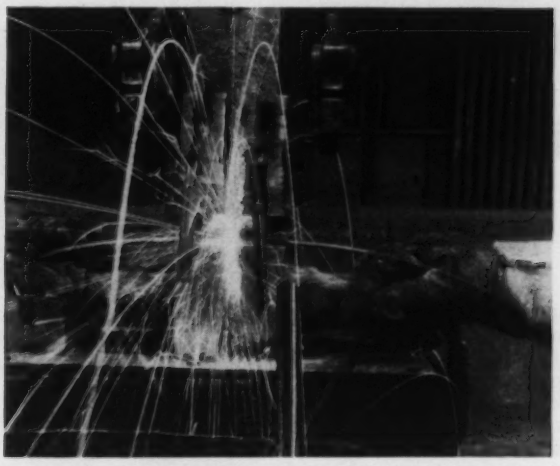
wherever electricity is distributed and controlled

6670

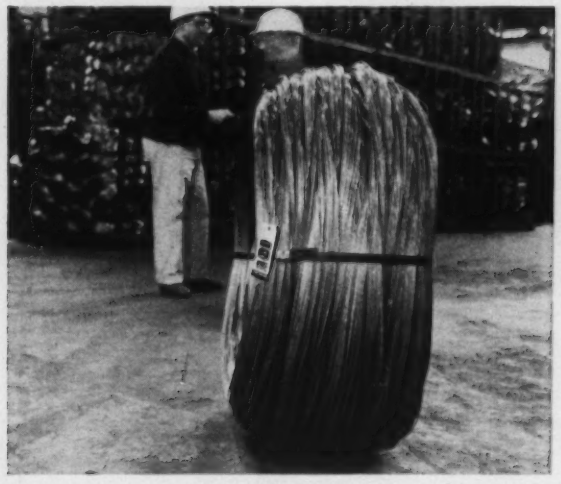
Here's how Bethlehem Wire in heavyweight coils cuts your costs

Bethlehem heavyweight coils, with from 1,000 to 2,000 lb of wire in one continuous length, offer these cost-cutting advantages:

REDUCED MACHINE DOWN-TIME—By using the heavyweight coil, instead of 13 150-lb catchweight coils, you save a maximum of 12 costly machine shutdowns necessary every time you start a standard size coil.



LESS BUTT-WELDING AND COIL REMNANT SCRAP—In operations requiring the welding of coil ends, the time and cost of butt-welding is reduced. And there's less waste in the form of coil remnant scrap.



NO DEPOSITS . . . NO RETURNS—Returnable carriers are not needed with Bethlehem heavyweight coils. Carriers take up valuable storage space, involve extra paperwork, and tie up your cash.

MINIMIZED HANDLING COSTS—One man, operating a fork-lift, crane, or ram truck, can easily handle a heavyweight coil. Speedy unloading. Efficient stacking.

BUNDLED THE WAY YOU WANT THEM—We can supply our heavyweight coils with or without a pallet, for use on welded steel cores (rotating or stationary payoff).

Want more information? Get in touch with our nearest sales office. Or write to us at Bethlehem, Pa.

Steel *for Strength . . . Economy . . . Versatility*

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Export Sales: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

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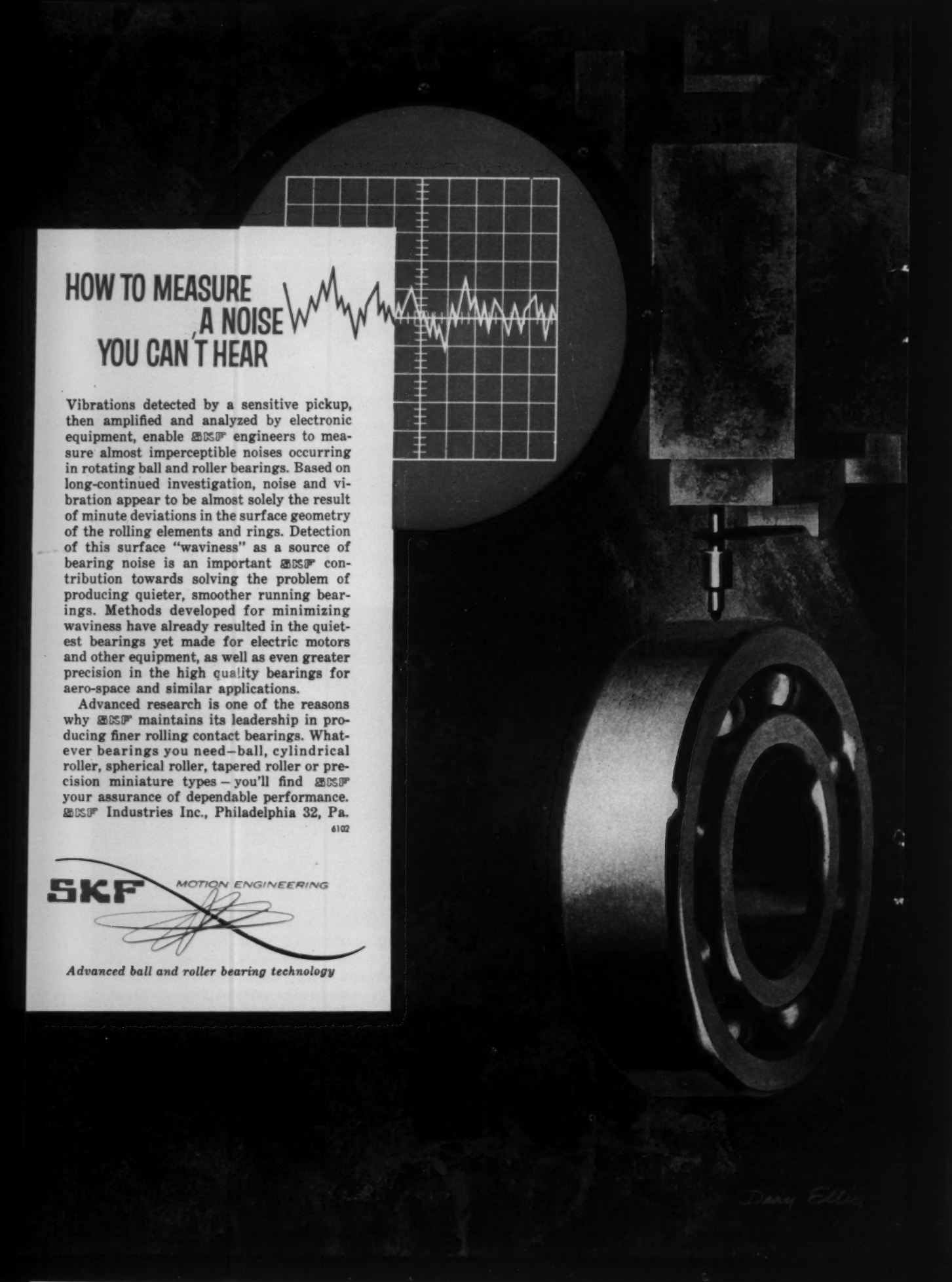

HOW TO MEASURE A NOISE YOU CAN'T HEAR

Vibrations detected by a sensitive pickup, then amplified and analyzed by electronic equipment, enable SKF engineers to measure almost imperceptible noises occurring in rotating ball and roller bearings. Based on long-continued investigation, noise and vibration appear to be almost solely the result of minute deviations in the surface geometry of the rolling elements and rings. Detection of this surface "waviness" as a source of bearing noise is an important SKF contribution towards solving the problem of producing quieter, smoother running bearings. Methods developed for minimizing waviness have already resulted in the quietest bearings yet made for electric motors and other equipment, as well as even greater precision in the high quality bearings for aero-space and similar applications.

Advanced research is one of the reasons why SKF maintains its leadership in producing finer rolling contact bearings. Whatever bearings you need—ball, cylindrical roller, spherical roller, tapered roller or precision miniature types—you'll find SKF your assurance of dependable performance. SKF Industries Inc., Philadelphia 32, Pa.

6102

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Advanced ball and roller bearing technology

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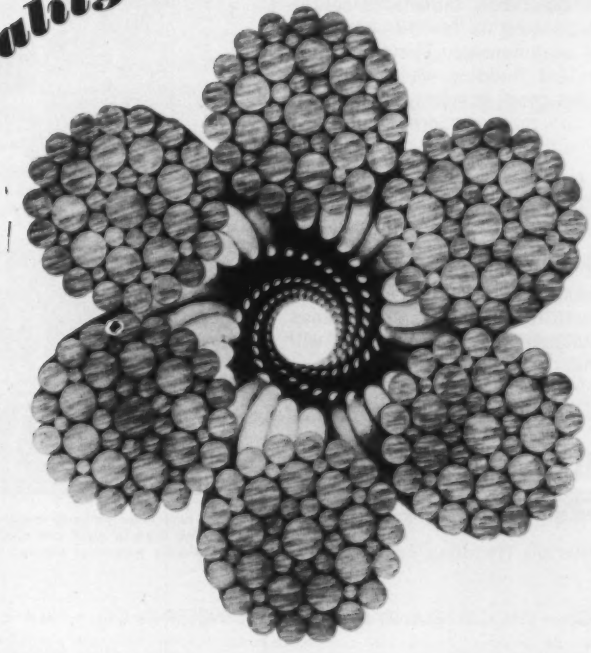

We put a lot of work into it—
You get a lot of work out of it

Engine Handling

MADE EASY IN NEW GIANT TEST BUILDING

Some of the many test cells served by easy rolling Cleveland Tramrail hand-propelled cranes with electric hoists of two and four tons capacity. Note the white glazed tile walls that aid in keeping the entire test area immaculate.

As a leading manufacturer of automotive diesel engines in the United States, powering more on-highway trucks than all other U. S. diesel builders combined, Cummins Engine Company, Inc., Columbus, Indiana, is continually improving and expanding its facilities to insure the highest quality of workmanship. The firm's new 300,000 square foot Test Building was a move in that effort. It was designed primarily for engine testing and provides the most modern facilities in the diesel industry.

Cummins has had long, favorable experience with Cleveland Tramrail equipment in many of its hard-working shop areas. This was an important consideration in its selection for the new Test Building. All individual engine test cells, plus the larger cells for testing marine engines, generator sets and power units, are equipped with individual Tramrail cranes. Other areas of the building were also provided with many Cleveland Cranes.

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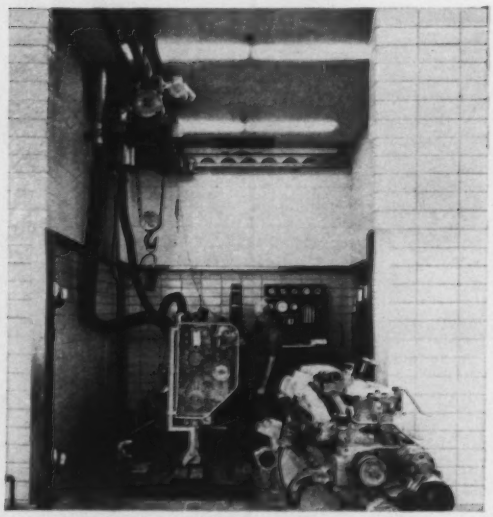
CLEVELAND TRAMRAIL

Overhead Materials Handling Equipment



There is no delay in handling engines in and out of a test cell. The man in each cell can take care of this easily and immediately whenever desired with the crane in the cell.

CLEVELAND TRAMRAIL DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 7864 E. 290 ST. • WICKLIFFE, OHIO

Accent on Washington

Washington Editor Jack Botzum keeps track of the capital angle on labor for STEEL's readers and has been particularly active in contributing to our weekly coverage on the auto talks.

He keeps you up to date on a lot of other matters, too, as his column, "Windows of Washington," on Page 32 testifies.

Before joining STEEL in 1956, Jack was an editor with Babcox Publications in Akron. He has also served as an instructor at the University of Connecticut where he did graduate work. He was graduated from the University of Akron and was in the U. S. Army for two years.

Accent on Depreciation Reform

A speech on depreciation reform by Associate Managing Editor John Morgan is reprinted in the July 10 edition of the *Congressional Record*. The talk, given June 17 in Boston before the annual meeting of the National Association of Metal Finishers, was a summary of recent articles in STEEL on the subject. The speech was inserted in the *Record* by Rep. Thomas J. Lane (D., Mass.).

We Like It This Way

Metallurgical Editor Ed Case and Assistant Editor John Teresko blue penciled out a phrase in their article on plating errors (Page 56) that we think reads better in erroneous than in corrected form.

They had solicited comments for the story from Battelle Memorial Institute. The good people down there obliged, but were so rushed that they dictated their replies and sent the disc to us to transcribe.

Here's the stenographer's interpretation of one statement: "He can't take every souse here and make a silk purse out of it."

International Magazine

The pilot issue of STEEL INTERNATIONAL is out now. Regular monthly publication will begin with the January, 1962, issue.

Editorially, its purpose is to inform the Free World's managers in metal producing and metal using plants about U. S. managerial, marketing, and technical developments. Commercially, its aim is to help U. S. companies reach the growing Free World markets with their advertising.

A special editorial staff and STEEL's regular editors will edit the magazine. STEEL's business staff will handle sales.

STEEL INTERNATIONAL will reach all industrialized nations of the Free World, except the U. S. and Canada which will continue to be served by STEEL. The new publication will have a controlled circulation of 17,000, going primarily to companies overseas that employ 100 or more, or are capitalized at the equivalent of $500,000 or more. It will be written primarily in English. Two, eight-page sections that summarize editorial contents will be translated into German, French, and Spanish.

STEEL's co-publishers, Walt Campbell, editor, and Sal Marino, business manager, have been studying the problem of foreign distribution for several years. They chose the establishment of STEEL INTERNATIONAL as the most efficient way to reach overseas readers. They'll have the same titles and responsibilities for the international publication as they do for STEEL.

Winner

W. T. Kaarlela, a metallurgist for General Dynamics/Ft. Worth (Tex.) Div., General Dynamics Corp., has earned a second $500 from STEEL. He got his first $500 as the November winner in our 1960 Usership Idea of the Month contest. An article on surface carbon in steel (Nov. 28, 1960, p. 118) sparked an idea with him.

He has just submitted proof that the idea bore fruit, so the second award is his.

Question

"IITYWYBMAD?"—can you guess what that stands for?

STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $30 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.

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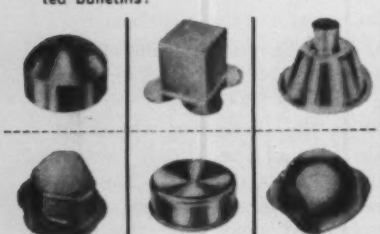

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METAL CRAFTSMEN SINCE 1924

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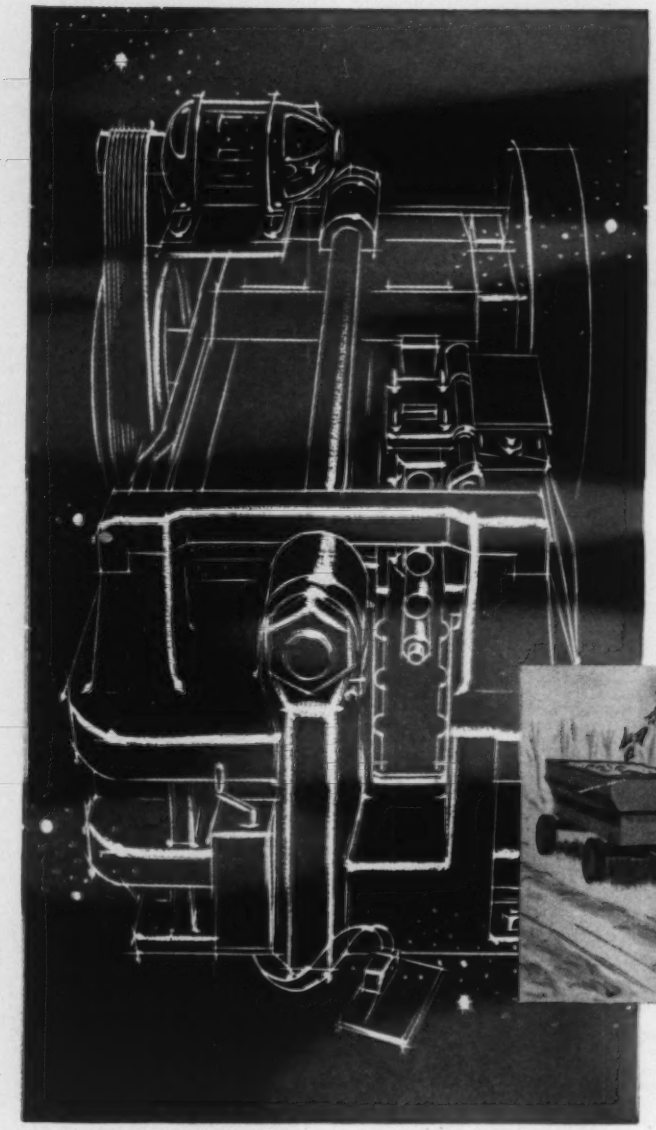

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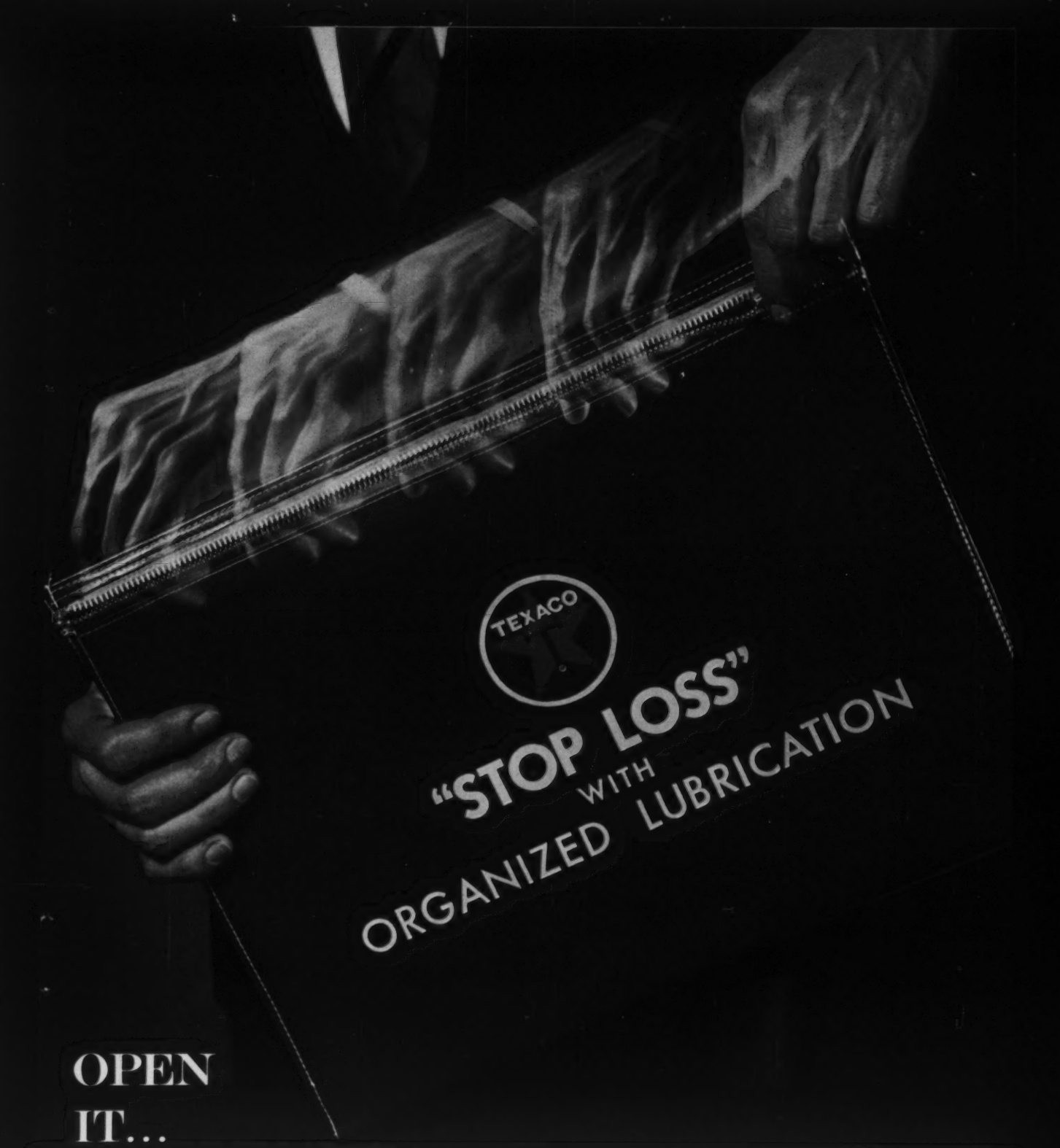

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CALENDAR
OF MEETINGS

Aug. 15-17, Cryogenic Engineering Conference: University of Michigan, Ann Arbor, Mich. Conference secretary: K. D. Timmerhaus, Department of Chemical Engineering, University of Colorado, Boulder, Colo.

Aug. 16-19, Society of Automotive Engineers: National West Coast meeting, Sheraton Hotel, Portland, Oreg. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: Joseph Gilbert.

Aug. 22-25, Western Electronic Show and Convention: Cow Palace, San Francisco. Convention director: Calvin K. Townsend. Business office: 1435 La Cienega Blvd., Los Angeles 35, Calif. Northern California office: 701 Welch Rd., Palo Alto, Calif.

Sept. 10-12, Steel Service Center Institute: Great Lakes regional meeting, Greenbrier Hotel, White Sulphur Springs, W. Va. Institute's address: 540 Terminal Tower, Cleveland 13, Ohio. Executive vice president: Robert G. Welch.

Sept. 11-12, American Supply & Machinery Manufacturers' Association Inc.: Industrial distribution conference, Statler Hilton Hotel, Cleveland. Association's address: 2130 Keith Bldg., Cleveland 15, Ohio. Business manager: W. B. Thomas.

Sept. 17-21, Non-Ferrous Founders' Society: Annual meeting, Shawnee Inn, Shawnee-on-Delaware, Pa. Society's address: 1604 Chicago Ave., Evanston, Ill. Executive secretary: Herbert F. Scobie.

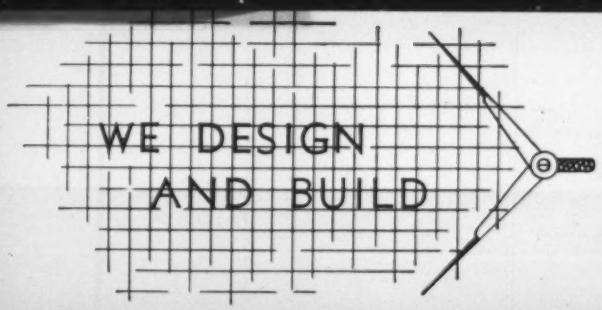
Sept. 18-20, Standards Engineers Society Inc.: Annual meeting, Hotel Sherman, Chicago. Society's address: Box 281, Camden 1, N. J.

Sept. 24-26, Steel Founders' Society of America: Fall meeting, The Homestead, Hot Springs, Va. Society's address: 606 Terminal Tower, Cleveland 13, Ohio. Executive vice president: F. Kermit Donaldson.

Sept. 24-28, Pressed Metal Institute: Annual meeting, Grand Hotel, Point Clear, Ala. Institute's address: 3673 Lee Rd., Cleveland, Ohio. Managing director: J. D. Keith.

Sept. 25-28, American Welding Society: Fall meeting, Adolphus Hotel, Dallas. Society's address: 33 W. 39th St., New York 18, N. Y. National secretary: Fred L. Plummer.

Sept. 25-28, Association of Iron & Steel Engineers: Annual convention, Penn-Sheraton Hotel, Pittsburgh: Association's address: 1010 Empire Bldg., Pittsburgh 22, Pa. Managing director: T. J. Ess.



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Bringing important new economies to rail shipment of automobiles, this new tri-level auto carrier holds twelve standard cars or mixed loads of 14 standards and compacts. Capacity is increased up to 75%. A unique system of hydraulically positioning the vehicles on three levels gives a clearance of only 16 feet 8 inches, permits use in areas formerly limited to bi-level unit operation because of clearance requirements. ◆ Key feature of the Multi-Car Carrier is the movable decks on which the cars ride. Made of GLX-W columbium-treated steel, the decks are raised and lowered by built-in hydraulic lifts, actuated by a portable power unit. Here light weight was essential, in order to reduce the operating power requirements. Yet great strength was necessary, too, to support the payload. Finally, design of the decks called for eight bends in each section. So formability was also a must. ◆ GLX-W met and exceeded all these requirements. It gives 50-100% greater strength than mild carbon steel, so builder Whitehead and Kales could get the required strength with less weight. Deck operating units need less power,

Great Lakes Steel is a Division of

Multi-Car Carrier built by Whitehead and Kales for Multi-Car Corporation, Detroit, Michigan

TRI-LEVEL AUTO CARRIER

and total weight is reduced approximately 5,000 pounds or 10%. Production is more economical, too, because the ductility and formability of GLX-W permits four of the bends in the deck to be performed in one press operation. ◆ The GLX-W series of high-strength steels consists of fine-grained, semi-killed mild carbon steels, treated with varying amounts of columbium. The high strength of GLX-W permits designers to reduce the amount of steel and effect considerable cost savings when replacing mild carbon steel. GLX-W steels have a low carbon content and are readily weldable and formable. GLX-W steels are available at four minimum yield strength levels: 45,000, 50,000, 55,000 and 60,000 p.s.i. and in sheets, plates and bars. For complete technical information, write Great Lakes Steel Corporation, Product Development, Dept. SM-9, P. O. Box 7310, Detroit 2, Michigan.

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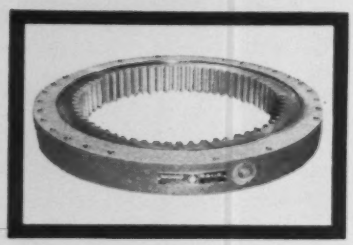

Amweld flash butt-welded rings can cut your costs!

Amweld flash butt-welded rings are today lowering costs on gear blanks, bearing races, frame rings. Also rings for OEM, such applications as jet aircraft engines, missiles, and scores of other applications. Savings to Amweld customers totaled over one million dollars last year alone!

Here's your opportunity to reduce the cost of your circular components and assemblies. Amweld's close-tolerance fabrication of flash butt-welded rings cuts waste of materials, cuts out unnecessary machining. And Amweld's ability to flash weld materials to Aeronautical Material Specifications offers proof of Amweld quality.

Investigate now! To see how Thew Shovel Company makes profitable use of Amweld flash butt-welded rings, mail coupon below for your free copy of Application Study R-1. Then let your Amweld representative show you how much flash butt-welded rings can cut the cost of your circular components!

AMWELD INDUSTRIAL PRODUCTS

The American Welding & Manufacturing Co.
805 Dietz Road, Warren, Ohio

Yes, send Mono-Race Application Study along with full details on Amweld flash butt-welded rings as a cost reduction opportunity.

Name & Title_____
Company_____
Address_____
City_____
State_____

Amweld supplies flash butt-welded rings for the races of "Mono-Race" connections, designed and manufactured by The Thew Shovel Company's Mono-Race Division, Lorain, Ohio. This 10 ton hydraulic crane, manufactured by Grove Manufacturing Company, Pennsylvania, is a typical application of a Mono-Race connection.

Blough Sees 'Moderately' Better Business

Roger M. Blough, chairman, U. S. Steel Corp., looks for "moderately and consistently better business" over the rest of the year. He expects second half steel shipments to run around 40 million tons vs. 31.4 million in the first half for a yearly total about equal to last year's mark. He expects 1961 ingot production to about equal last year's 99.3 million tons. He anticipates an inventory buildup of around 2 million to 3 million tons in the second half.

Buds of Better Business Begin to Bloom

It now seems certain that metalworking will experience a strong upturn in the second half. Spending by all three national segments—consumers, business, government—have turned up and faster increases are forthcoming, if business indicators prove accurate. Examples: Personal income in June jumped to a seasonally adjusted annual rate of $416.5 billion—$3.5 billion above the May mark and $13.5 billion above the recession low in February . . . June shipments by makers of durable goods rose 1 per cent, seasonally adjusted. Orders declined 1 per cent from the May level, but remained 2 per cent above the mark for the year-earlier month . . . Housing starts in June reached 136,900—up 6300 from May and 8700 from June, 1960 . . . The primary metals industry operated at 70.5 per cent of capacity in June vs. 69.4 per cent in May . . . June sales by members of the National Industrial Distributors' Association rose 4 per cent above the May level to only 2 per cent below the year-ago mark.

Tips on Trimming Your Shipping Costs

"Transportation costs generally have more than doubled in the last decade," reports Stanley H. Brewer, professor of transportation, University of Washington, Seattle. Material flow costs are the third highest business costs—outranked only by labor and the materials themselves. And—the rate of increase in material flow costs have far exceeded the rate of production costs in many industries. Shippers, who spend $50 billion annually for transportation, are taking many routes to lower costs (Page 28).

Allegheny Ludlum Quits Steel Labor Negotiating Group

The specialty steel producer has withdrawn from the Steel Companies Coordinating Committee, which spearheaded the industry's negotiations with the United Steelworkers in 1959. The company points out that the move was made on a friendly basis, well in advance of 1962 bargaining. Allegheny Ludlum, tenth steelmaker in sales last year, was the only nonintegrated producer on the committee. When the industry was struck in 1959, many of

the company's competitors—40 per cent of the stainless industry and 50 per cent of the tool steel industry—continued to operate.

Glowing Future Predicted for Curtain Walls

"Use of metal curtain walls is growing so rapidly that if present trends continue, 25 per cent of the total outside wall area of all nonresidential buildings being erected by 1963 will be clad in metal." So says Olin Mathieson Chemical Corp., which has just completed a market survey. The firm says curtain walls accounted for about 15 per cent of exterior wall area installed last year.

Dues Rebel Leader Ousted by USW Local

Nicholas Mamula, top insurgent in the United Steelworkers, has been removed from office as president of the 12,000 member Local 1211 at Jones & Laughlin Steel Corp.'s Aliquippa (Pa.) Works. Members of the local voted (161 to 144) on July 20 to uphold the verdict of a trial board which had convicted him of misconduct in office and violation of the union's constitution. He was suspended and ordered to pay a $2000 fine. Ironically, the charges were preferred by Louis "Blackie" DeSena, his financial secretary, former friend, and chief of defense in a 1958 "dual unionism" trial. Mr. Mamula says the case against him was rigged, and he vows to carry his fight into federal court under the Landrum-Griffin Act.

Radio System to Be Run by Sun

An engineer at Hoffman Electronics Corp. shows the elements of CLEAR, a radio-public address system powered by silicon solar cells mounted with the loudspeaker. It's designed for use in isolated villages abroad where electric power is lacking. The International Co-operation Administration has already ordered four systems for trial installations abroad. Batteries store power for night use.

Color TV Sales Set to Soar

Radio Corp. of America predicts that industry sales of color TV sets during 1961 will be "more than 50 per cent higher than those of last year." RCA's sales in its first half were up 20 to 25 per cent over the like 1960 period.

Business Failures Drop; Incorporations Rise

Business failures declined 9 per cent in June, but they held above the level for any month in 1960 or 1959. Among manufacturers, the toll dropped to a

nine-month low, with much of the improvement in the metalworking industries. New business incorporations edged up in June to reach the highest point, seasonally adjusted, since August, 1960.

Experts Give Electroplating Advice

Electroplating experts at Battelle Memorial Institute say that you're passing up major gains in quality and cost reduction benefits if you don't develop a close relationship with the plating firm that serves you. Dr. C. L. Faust (photo) suggests that purchasers look at the plated surface as a material and provide specifications for properties needed to do a specific job—just as you would do in buying a metal. The experts also point to new information on commonly used platings (see Page 56).

Canadian PAs See Better Business

Higher production and employment, an increased volume of orders, stable inventories, and limited price changes—that's the picture revealed by the June survey of the Canadian Association of Purchasing Agents. The survey also discovered that delivery times are lengthening.

NICB Survey Predicts Better Second Half

Dollar billings for the second half of '61 are expected to be greater than those of the first half for 3 in 4 of the 220 manufacturing firms surveyed by the National Industrial Conference Board. Nearly 4 in 5 firms predict an increase in orders. About half look for pretax profits to rise; 43 per cent foresee an increase in employment; 42 per cent expect 1961 capital outlays to exceed those of 1960.

Design for Profit Growth

R. R. Miller, president, Precision Metalsmiths Inc., Cleveland, suggests using suppliers' design skills as a way to boost your earnings. Another bit of advice: Plan the material, the process, the finish, and the delivery requirements during the design stage. For other tips, see the fifteenth article in STEEL's 1961 Program for Management (Page 35).

Australia May Get Stainless Strip Facility

Atlas Steel Co. of Canada is considering opening a plant in Australia to produce stainless steel strip. Company executives have been in Australia discussing the venture with government officials. The facility would probably be in Sydney. The nation now has one stainless strip producer.

Wholesale Prices Fall; Consumer Prices Rise

The Labor Department's wholesale price index (1947-49 = 100) dropped 0.4 per cent in June to 118.2. The index has declined 1.4 per cent in the last three months and is at the lowest level since November, 1957. The department's consumer price index (1947-49 = 100) rose 0.2 per cent to a record 127.6

STEEL
The Metalworking Weekly

July 31, 1961 Vol. 149 No. 5

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per cent in June. The department reported, however, that a lengthening workweek and rising wages more than offset the price rise to give consumers their most potent buying power since December, 1959.

Smiley Sees U. S. Losing Export Leadership

By 1970, the U. S. will have only 13.4 per cent of the Free World market for merchandise exports (vs. 18.3 per cent now) and will fall to the position of fourth largest exporter, Ralph E. Smiley, president, Booz, Allen & Hamilton International Inc., told the Inter-American Industries Conference in Chicago, held in connection with the 1961 Chicago International Trade Fair. The major reason for the decline, Mr. Smiley said, is the rise of trade areas.

Go to Africa, Young Man, and Think Small

It could well be that manufacturers of consumer items in the U. S. are missing a chance by not going on a small scale into such preferred and more stable Afro-Asian areas as Senegal, Nigeria, Tunisia, Tanganyika, the Brazzaville Congo, Malaya, Singapore, and Thailand, asserts S. J. Rundt, New York consultant on international business. He points out that the Germans, Italians, and Japanese believe that the developing nations need, to start with, fewer giant power dams and steel complexes and more small ($50,000 to $100,000) factories to produce basic consumer goods.

Iron Ore Find in Queensland

An iron ore deposit has been discovered in Queensland, Australia, near the Kianga coal fields, 40 miles from a proposed railway to Gladstone. Premier Nicklin says this gives Queensland its first real chance for the establishment of a steel plant. He reports that the deposits are being surveyed, and if they prove sufficient, the government will try to attract foreign capital.

Straws in the Wind

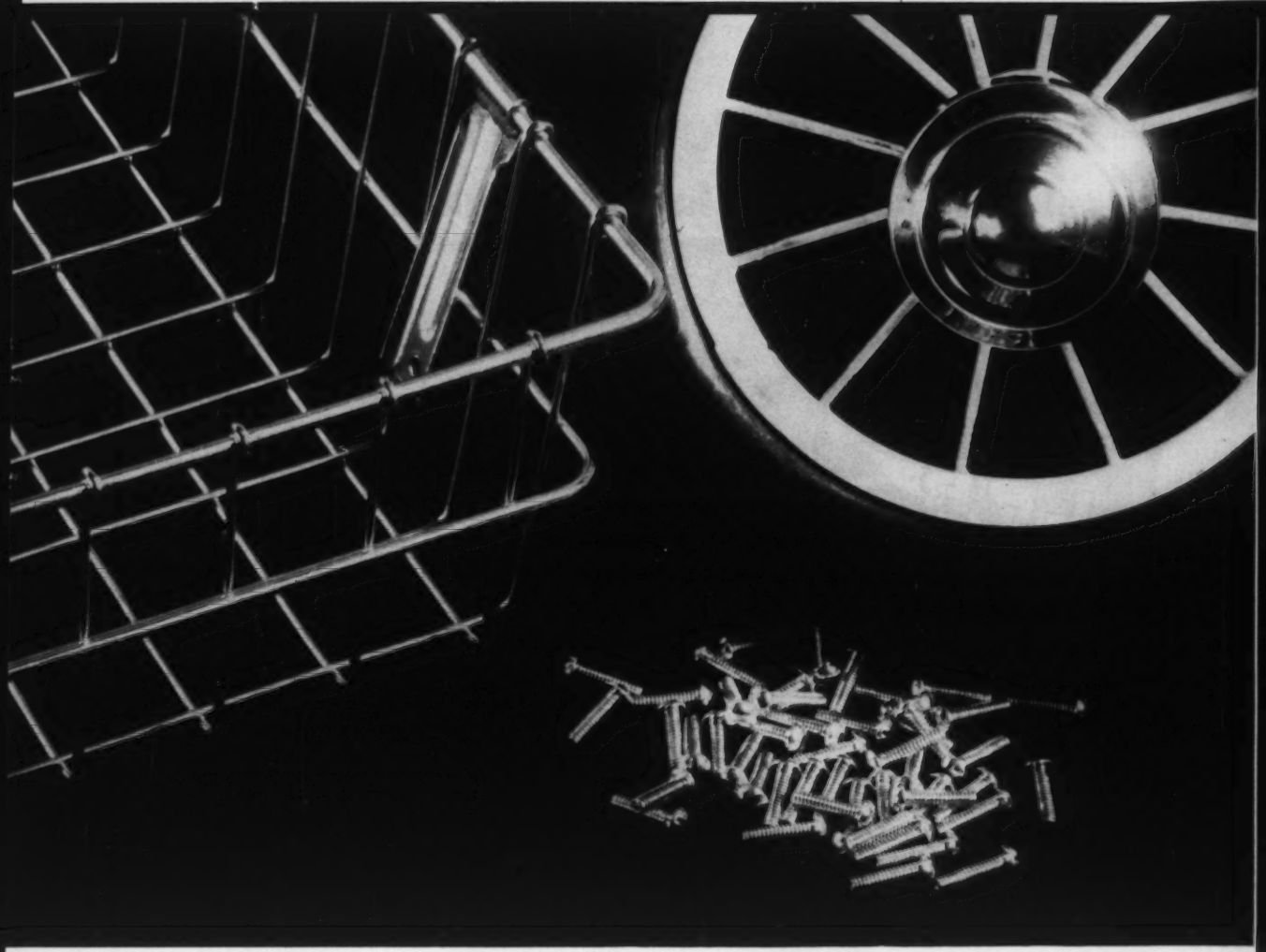
Deliveries of new freight cars totaled 3142 in June vs. 3360 in May; June orders fell to 1214 from 3666 in May, the American Railway Car Institute reports . . . June bookings by members of the American Institute of Steel Construction (structural steel fabricators) fell to 297,555 tons from May's 391,703 tons, but held within 1 per cent of the June, 1960, mark.

Metalworking Pulse

The Business Trend: Opposite forces among the components of STEEL's industrial production index about balance out as the trend line continues to move sidewise. The direction isn't apt to change much in the next few weeks. **Autos:** The downtrend in production continues as more facilities are halted for model changeover. Only Ford and scattered Chevrolet plants are still turning out 1961 model cars. **Steel:** Ingot output held to about the week-ago level.

- **INDUSTRIAL PRODUCTION INDEX**
  (1947-49 = 100)
  Week ended July 22 .... 164†
  Year ago 152
  Details on Page 45
- **PASSENGER CAR OUTPUT (UNITS)**
  Week ended July 29 . 75,000*
  Year ago 107,019
  Details on Page 42
- **STEEL INGOT OUTPUT (TONS)**
  Week ended July 29 1,860,000*
  Week ago 1,858,000
  Details on Page 92

†Preliminary. *Estimated.



Only M&T offers such a complete "package" for high quality, low cost zinc finishes

A zinc finish on certain products, such as the ones illustrated, is often a better choice than a painted finish . . . or improperly applied bright chromium. That's because it protects the base metal longer under corrosive conditions. What's more, it is applied at only a fraction of the cost of a chromium finish. For such a high quality low cost finish, M&T now offers you this complete package:

First, there's a new M&T Zinc Plating Process. It includes unique M&T Zinc Brighteners. Not only do you plate with remarkable brilliance, but also cover items uniformly, even in recesses.

Then, you have a complete choice in M&T chromate treatments. Unichrome Clear Dip imparts chromium-like lustre and color. With M&T's Dyed Dips, you can produce a rainbow of metallic colors. And there are others for black, olive and brass colored finishes; in fact, the M&T line of Unichrome Chromate Dips is among the broadest to be found.

Finally, to increase protection against wear as well as corrosion, if the service requires it, there's a group of outstanding Unichrome Clear Enamels. These are no ordinary organic coatings. They're designed for metals, and have proved their quality and durability in exacting jobs for over 20 years.

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PHOTO: COURTESY G-E DISHWASHER DEPT., LOUISVILLE, KY.

HOW BIG PAYLOAD LPR's SHRINK HANDLING COSTS—Take the receiving operation itself: Users report that LPR's consume half the time required for conventional bundles of equivalent total weight; more LPR wire can be stocked per cubic foot, saving storage space and making it safer, easier to get at and faster to handle . . . housekeeping is improved, inventory control simplified; fewer stock transfers between storage and production departments lighten plant traffic. *LPR's save you time; LPR's save you money.*

HOW DSC LONG PRODUCTION RUN LPR's SLASH FABRICATING COSTS—Users report: Fewer coil changes and setup adjustments reduce downtime, increasing machine-man-hour output; LPR's put new vigor into older machines so they produce more efficiently, let newer, faster equipment perform at peak. *Greater productivity with LPR's means lower operating costs.*

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Modernization Loans

Earlier this month, this magazine reported (July 3, p. 26) a new approach to encourage industrial modernization and re-equipment. Under the proposal, the government would set up a plan to guarantee 80 per cent of private loans to industries to finance capital equipment purchases. The program would be similar to the Federal Housing Administration's loan guarantee program for home building.

To avoid any cost to the government, a 1 per cent premium would be charged on the guarantees. Interest rates would be set 0.5 per cent above the government borrowing rate. Loan terms would be seven or eight years.

The program was designed to aid companies, particularly those in the middle size range, to raise their production efficiency and enable them to compete in the world market. Advocates of the loan guarantees found in preliminary surveys that many medium sized plants want to modernize but lack the necessary capital. Often their capital requirements are too low to justify tapping the public markets.

We believe the modernization loan program is a good proposal, one that should be pushed by the administration and enacted by Congress.

Readers agree.

The top executive of a company operating three metalworking plants says: "While true depreciation reform rather than the hard-to-understand and hard-to-evaluate Surrey plan is still urgently needed, the idea of government guaranteed loans appears to be an excellent one.

"Like many firms, we really don't fit into the 'small business' pattern, but are nevertheless quite removed from the possibility of obtaining expansion funds by public flotations of loans or stock issues. The banks, on the other hand, like to stick with short term business which does not lend itself too well to machinery purchases."

A manufacturer of woodworking machinery points out his industry has suffered badly from foreign competition and is seeking to develop new products to serve other industries. The handicap is lack of capital to purchase the necessary new equipment. He believes the modernization loan program would be the answer.

We hope the administration takes enough time out from foreign aid deliberations to formulate a little aid for the home folk.

Walter J. Campbell

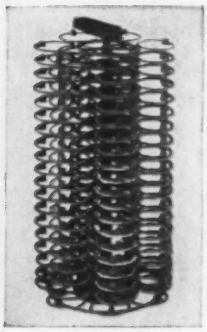
EDITOR

Cast iron parts, produced by Perfect Circle's unique casting techniques, are used in critical wear points in both cast iron and non-ferrous engines. Cylinder liners are centrifugally cast, piston inserts and rings are produced by the stacked mold process. Gray iron valve guides are virtually a must for engines with non-ferrous cylinder heads. In each case, Republic Pig Iron is the base metal. Simple economics dictate the use of cast iron parts to resist wear at critical points.

REPUBLIC PIG IRON SPECIFIED FOR STACKED MOLD, CENTRIFUGAL CASTING

Uniform Chemistry, High Quality are Ideal for Unique Processes

In these two casting processes—stacked mold and centrifugal—Perfect Circle Corporation maintains stringent quality control programs. Control begins with the selection of pig iron. To suit Perfect Circle's metallurgists, the iron must have a perfectly uniform chemical composition with exact graphite distribution, and be of consistent high quality. To produce the gray iron parts on the opposite page, by the casting methods described below, Perfect Circle selected Republic Pig Iron as the base metal.

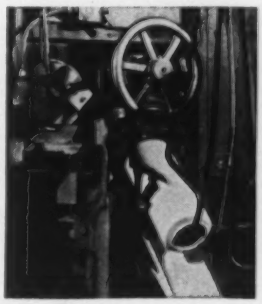


STACKED MOLD

In this process, stacks of green sand molds move along conveyors to the pouring station. Metal may come direct from a cupola or from an electric furnace. As the stacks cool they move to the shake-out station, where the cast "Christmas trees" are lifted and shaken free of the copes and sand.

By this process, Perfect Circle is able to produce several hundred castings at one pour. Dimensions are limited only by the depth and diameter of the cope.

CENTRIFUGAL



This process begins with installation of a permanent mold into a spinner where it is heated, spun to an interior force of 120 gravities, and coated. A measured weight of metal is poured into the mold. Through precise control of the mold temperature and the coating, the cooling rate is regulated to produce the desired microstructure. The spinning process squeezes gases and nonmetallic impurities out of the metal, and continues until the casting temperature drops to 1500°—1700°. The finished casting is then removed.

The castings are end-cropped to length and machined. The process allows a significant reduction in scrap loss, stock removal allowances, machining time, and costs.

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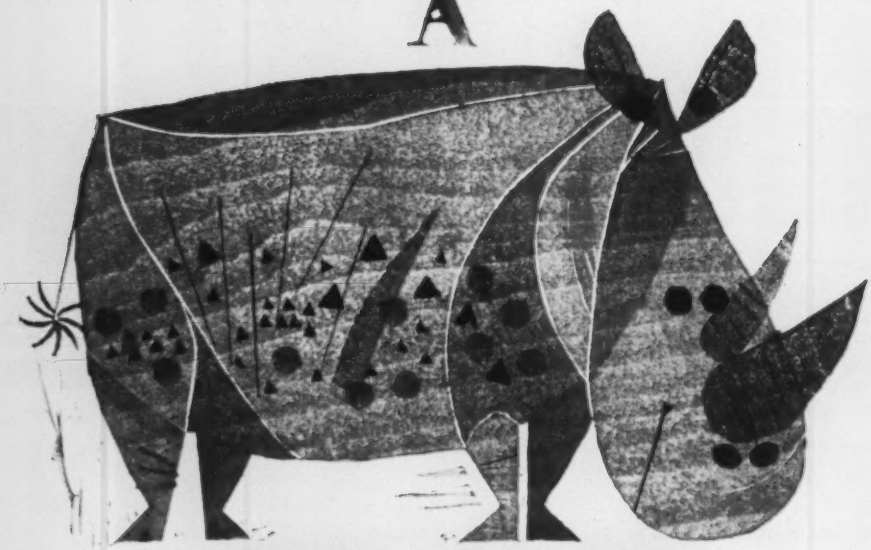

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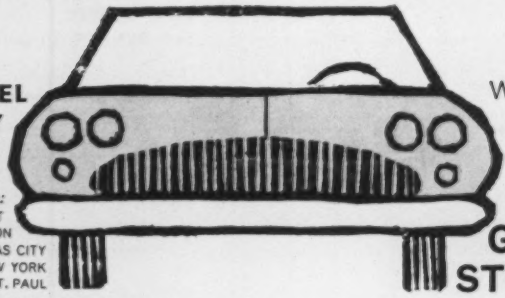

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President Kennedy has this mobilization authority already . . .

1. **Production Materials—he may establish priorities for defensework and allocate materials and facilities.**

2. **Personnel—he has the authority to assign members of the national defense executive reserve to government positions.**

3. **Production Facilities—government has authority for financing (direct loan or guarantee) defense production facilities. Many machine tool builders have accepted "M-Day pool orders" to be triggered by the Office of Emergency Planning.**

4. **Defense Contracts—While the Armed Forces Procurement Act specifies formal advertising of defensework, exceptions permit use of negotiated contracts to facilitate national defense.**

What Mobilization Would Mean to You

HOW WILL metalworking be affected if President Kennedy calls for partial mobilization?

Mobilization officials say the nation's industrial plant is in readiness, and the administration already has the necessary powers to make the transition smoothly. William C. Truppner, director, Office of Industrial Mobilization, Business & Defense Services Administration (BDSA), described the situation to STEEL:

BDSA broadly is responsible for production and materials resources for defense. It is the agency's job to be prepared to shift the economy to an emergency footing on a moment's notice. Its attention is directed to three areas:

1. Existing mobilization authority available to the President in this cold war period (see exhibit). 2. Preparation of plans for maintaining the flow of defense products during a limited war. 3. Preparation of plans for a nuclear war, including the postattack period.

Mr. Truppner's office administers the defense materials system (DMS) which provides priorities for defense, space, and atomic work. The system now operates in those areas and would be extended to nondefense work, if the President decided it necessary to maintain the civilian economy on an even keel. (A rush of rated defense orders could cause shortages of essential civilian goods.)

Mr. Truppner anticipates no problem in putting the system into effect because contractors have had experience with it since the Korean War. He concludes: "Our readiness posture is an excellent one," and added that there would be no wild scramble for materials under emergency conditions.

One reason the President did not have to declare a national emergency in his Berlin crisis speech: The economy is operating at a pace which can take increased defense demands without creating shortages.

• **Stockpiles**—Our $8 billion stockpile of critical materials is in good shape and doesn't require over-all expansion, say Capitol Hill sources. In fact, the Berlin crisis probably won't slow down what little disposal we've had the last year or so. (Reluctance of government officials to disturb the markets for stockpiled commodities has kept them from large disposal programs, although critics of the stockpile

claim we have too much investment tied up in it.) One example of items still being added to the stockpile: Jewel bearings, which are considered vital to advanced defense systems.

• **Machine Tools** — There is no problem in machine tools. Orders are ready to be issued by the Office of Civil & Defense Mobilization (soon to be renamed the Office of Emergency Planning and lose its civil defense operations to the Pentagon). Requirements would trigger production of almost 15,000 general purpose tools worth $237 million. Latest figures show that 82 machine tool builders have accepted such "M-Day pool orders," which can be triggered by telegram. The tools would be delivered to designated defense users within six months.

The government has about 88,000 machine tools that are ready to be put into action, and, in addition, some of the 150,000 tools owned by the military services may not be operating full time now. One possible result of the Berlin situation: Military officers in charge of declaring tools "excess" to their requirements may tend to hold off. OCDM expected about 20,000 tools to be "excess" in fiscal 1962.

One OCDM official emphasizes: There is absolutely no shortage of production equipment for limited war buildup.

If the situation becomes more serious, there will be cause for reinstituting the five year writeoff for defense facilities, or for providing additional borrowing authority for government loans for defense facilities.

• **Labor**—The Berlin situation has already had some effect on labor. It is reported that the Department of Labor is talking tough to unions contemplating strikes during this period, particularly those which might most directly affect a buildup in Europe.

The department conducts periodic meetings with OCDM on manpower supply. One official thinks that skilled labor will be available as fast as industry can build up its production.

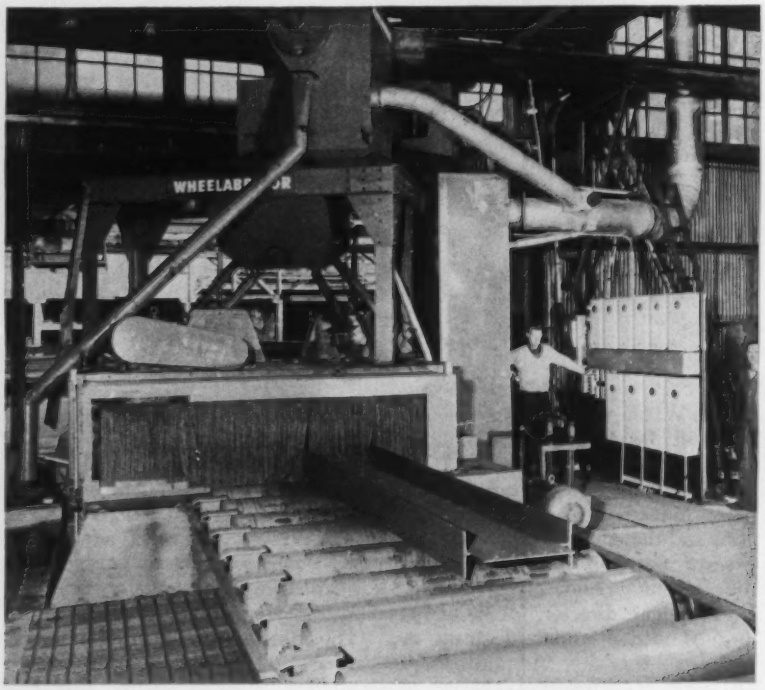
• **Controls** — Labor Secretary Arthur Goldberg assured STEEL there was no need for standby wage and price controls at this time.

• **Exports**—Another area to be affected by Berlin is our trade with the Communists. Shipments of even semistrategic materials to the Reds are certain to be heavily criticized by Congress and the public. One source suggested that the shipment of carbon steel to the USSR would be halted by public demand, if not by the Commerce Department. House Republicans are already speaking out.

Last week, the House Republican Policy Committee pointed out: 1. It took strong Congressional protests to prevent the export of machine tools to the USSR last spring. 2. Scrap metal shipments to Yugoslavia from Michigan hit 6250 tons in one week recently. Concludes the committee: "We must exercise extreme care to avoid helping to contribute to Soviet war capabilities."

Export controls involving non-Communist countries are conceivable if tension increases. One source close to the White House suggested that machine tool exports might be suspended once the industry's backlog approaches 18 months. But current backlogs of about four to five months make that day seem far off.

• **Exec Reserve**—The possibility of calling up any of the 3000 industrial executives who belong to the National Defense Executive Reserve is remote at this time. Upon the receipt of orders, they would move to predetermined locations to carry on the functions of government.



Structural Cleaning Halves Costs

STRUCTURAL cleaning costs were reduced 50 per cent with an airless, abrasive blast cleaning machine at Western Bridge & Steel Fabricators Ltd., Vancouver, B. C. Additional advantages include better welding preparation, plant housekeeping, layout, gas burning, tool life, and paint adhesion.

Four, high capacity, abrasive propelling units are used in the Wheelabrator cabinet (made by Wheelabrator Corp., Mishawaka, Ind.).

How Auto Stocks Are Shaping Up

AUTOMAKERS should have a five to six week stock of cars in dealers' hands when Big Three labor contracts expire on Aug. 31. About a third of them will be 1962 models. That inventory situation bolsters Detroit's belief that carbuilders are betting on a labor settlement without a strike.

They're trying to close down 1961 production, so there won't be a surplus of "last year's" cars when the 1962 selling season starts in September. General Motors Corp. and Ford Motor Co. dealers are already complaining that they're short on many styles, particularly the sporty compacts like Chevrolet's Monza and the Falcon Futura.

Only a few Ford lines are still in production. Everyone also is down for an early changeover. Startups on new models begin next week. Even so, August production is scheduled at less than 190,000 units. That still gives most divisions at least two weeks to debug assembly lines before contracts expire. They'll then be able to start up quickly if there should be a short strike in early September.

• **Low Inventories** — The outlook is for an inventory of 650,000 cars (including '62 models) at the end of next month. Stocks now stand close to 900,000. To reach the desired level, dealers will have to peddle about 15,300 cars daily during August. That should be easy. Even in the dog days of early July, the daily sales rate averaged 14,200. It ran at a near record 20,000 in June and has averaged about 17,700 this year.

If the labor contracts are signed by the deadline, dealers will start unveiling '62 models less than three weeks later. Detroit is chary about revealing introduction dates, but it looks like most Ford company lines, Chevrolet, Plymouth, Oldsmobile, Cadillac, and Studebaker are expected to appear between Sept. 15 and 26. The remaining makes will rush in during the next two weeks. By mid-October, all but a few of the specialty lines like Thunderbird will be before the public.

• **Fast Buildup** — Barring unforeseen trouble at the bargaining table, automakers are looking for a rapid buildup of '62s in the fourth quarter. *Ward's Automotive Reports* says tentative schedules call for 618,000 cars to be produced in October and suggests this level may be maintained through November and December too. If so, it would mean one of the boomingest last quarters since 1955 when 1.9 million units were produced.

With July - September output pegged at 1 million, 1961 calendar year production would reach 5.5 million cars (first half total was 2.7 million).

• **Better Year Ahead**—Detroit is starting to talk about a "better than 6 million" sales year in 1962. That will be a healthy improvement over this year's expected sales of 5.8 million autos, including imports.

Key Negotiators at GM Bargaining Table

Louis G. Seaton
Vice president-personnel
General Motors Corp.

Affable, "no nonsense" Lou Seaton has been active at the bargaining table for 25 years—all of it at General Motors. He started as a sign painter in 1928. He has been a vice president since 1957.

Active in charitable and civic affairs, 55-year-old Mr. Seaton is a native Detroiter and a graduate of Wayne State University. He's considered basically responsible for the cost of living and annual improvement concepts that GM instituted in auto bargaining in 1948. A major Seaton campaign is to convince hourly workers that fringe benefits are just as much a cost as direct wage increases.

Mr. Seaton deals with 21 international unions covering GM workers. He's a favorite with reporters, even though he once learned to say "no comment" in eight languages.

Leonard Woodcock
Vice president-director GM Dept.
United Auto Workers

Born in Providence, R. I., 50-year-old Leonard Woodcock spent his early childhood in England, moved to Detroit in 1926. He started working in the auto industry in 1933, and he has been active in labor work since that time. A UAW vice president since 1955, he is generally considered to be the heir apparent to Walter Reuther's post.

Know as a shrewd, articulate, and educated bargainer, Mr. Woodcock represents the "smooth" side of the modern labor movement. He is an elected member of the Wayne State University (Michigan) board of governors, is married, and has three children.

How to Trim

"TRANSPORTATION costs generally have more than doubled in the last decade," says Stanley H. Brewer, professor of transportation, University of Washington, Seattle. Industry plunks down an estimated $50 billion annually to move materials and goods to markets.

Everything from new packaging through better management control are among the tactics taken by shippers who work to slash costs.

• **The Gamut**—Joy Mfg. Co., Pittsburgh, has lowered its transportation costs from 4.1 per cent of the sales dollar in 1947 to 1.2 per cent. A. S. Robertson, general traffic manager at Joy, says transportation costs of machinery manufacturers, excluding electrical products, average 3.5 per cent of the sales dollar. To do better than the average firm, Joy gives special attention to consolidating shipments, conforms closely with freight classifications, moves exports to port in carload lots, and takes advantage of through rates on common carriers. Outbound freight shipment costs were reduced 0.0007 cent a pound in 1960 vs. 1959. Based on total weight shipped, the saving amounted to a healthy $43,415.

• **Packaging Benefits**—By replacing wooden kegs with corrugated boxes for nut shipments, Industrial Nut Corp., Sandusky, Ohio, cut costs six ways. Here's how Hinde & Dauch, Sandusky Div., West Virginia Pulp & Paper Co., cites the savings: 1. The basic package cost is less. 2. A box weighs 4¼ lb less than a keg. 3. 3500 boxes fit in space required for 800 kegs. 4. A box is filled in 10 seconds; a keg took 1 minute. 5. A box holds 25 per cent more nuts. 6. One man with a fork lift truck handles 3500 boxes in 20 minutes; four men handled 800 kegs in 30 minutes.

"There's an additional payoff in the box concept," says S. J. Cole, sales manager for Industrial Nut. "We have the boxes printed with our customers' names on them. They use them for shipping parts to their dealers. Savings to Industrial Nut's

TIPS FOR SHIPPERS

- **Start with the right container.**
- **Consolidate shipments when possible.**
- **Conform with freight classifications.**
- **Observe carrier regulations.**
- **Obtain ideas from customers, suppliers.**
- **Check tariff structures.**
- **Select the best route and carrier.**
- **Identify shipments with documents.**
- **Inspect damage claims and reports.**

Your Shipping Costs

customers amount to $2000-$3000 a month."

• **Preshipment Test**—Black & Decker Mfg. Co., Towson, Md., operates its own preshipment laboratory for testing packaged products. In about 75 minutes, the laboratory equipment can simulate 1000 miles of normal transportation. Previous methods took two weeks. Testing of a carton for a utility hedge trimmer showed the product was overpackaged when a 200 lb test board was used. A second sample, with 125 lb test board, was found O.K. The change meant a saving of 8 cents per package.

Westinghouse Electric Corp.'s Lamp Div. in Bloomfield, N. J., has introduced palletized shipments for 19 varieties of fluorescent lamps for industrial and commercial fields. Previously, the lamps were available only in 6, 12, and 24 lamp cartons. Now customers purchasing 300 or more lamps can request palletized shipments. There is no extra charge for the expendable pallets; the palletized shipments save as much as 30 per cent in warehouse space; lamps are stacked glass to glass, eliminating extra packing material. For example, an order of 1000 F40 lamps would normally contain 2000 separate pieces of packing material vs. 45 pieces for palletized loads.

• **Chats Pay**—"Traffic men for both venders and buyers should get together periodically to discuss mutual problems and alternative methods of shipping," says R. M. Stadick, general traffic manager, Electric Storage Battery Co., Philadelphia. Here's the result of a talk. One of Electric Storage's suppliers in the Midwest was shipping goods to Atlanta. The area is covered by two tariff bureaus, with carriers divided between the two. On one commodity, the rate differential between the two bureaus amounted to 62 cents per hundredweight. By talking about which carrier to use, instead of following an established pattern, Electric Storage saved $175 on each shipment.

In another instance, a Vermont vender shipped light, but bulky, articles on trucks. Each load weighed 8000 lb, yet Electric Storage was charged for 24,000 lb—as Mr. Stadick puts it: "16,000 lb of air." Mr. Stadick investigated, found the rate broke at 6000 lb for a-less-than-truck-load rate, and subsequent shipments were made in not more than 6000 lb lots. Cost cut: $175 per load.

• **Retain Identity**—"If a high value is involved and time factors are critical, make sure your shipment can be identified and located readily," says Karl Gresham, president, A. W. Fenton Co. Inc., Cleveland. The head of the international freight forwarding firm says carriers can trace shipments in jig time, using the numbers on conveyances and manifests. Companies often want to know if they should re-order goods that seem to have strayed. If the original shipment can be found, the re-order may not be necessary.

• **Inspect Damage**—Hinde & Dauch recommends that you take steps to correct damage. If it occurs in transit, try to determine why. Have salesmen inspect damage claims and make complete reports. Ask receivers to analyze the damage and take pictures, if possible, that reveal causes. Also, get the damaged container. It may be inadequate for the job, call for redesign or shipping procedure changes.

Nearly every carrier has a freight claims prevention agent or team. Check with them when you have a touchy shipment coming up. Men like A. W. Peterson, manager of station service and freight claims prevention for the C&O Railroad, constantly study and supervise loading methods. In one case, the C&O team suggested using an inflatable rubber sack, 4 x 8 ft, between stacks of high quality tile building blocks. The "balloon" cushioned the blocks against damage.

• **Seaway Savings** — "We used to ship overland to New York, then to Europe by water," discloses Russell Taccone, president, Taccone Corp., North East, Pa. "That meant an additional handling operation in Gotham. Now we truck components for our molding machines right to dockside in Erie, Pa., and oversee the loading procedure. Our inland freight rates are reduced as much as two-thirds, our personal supervision radically pares freight damage, and we can give more accurate delivery promises."

• **Scales Steal**—N. E. Cousineau, president, Ohio Counting Scales Inc., Cleveland, recommends daily checks by operators for proper balance and order in company scales. He also suggests testing scales every 30 days for calibration and performance. He relates this sad experience of a Cleveland fastener maker who didn't have checks on his balances. The firm shipped its products in 100 lb kegs. Unknowingly, each lot was weighed on a scale that was 1 ounce in error. Compounded 100 times a day during a year, that error cost the company $2500 in lost profits.

• **Other Cost Cutters**—There are innumerable ways to trim costs and save time in shipping. Taxicabs in Cleveland will deliver 50 lb packages at meter rates; saving paperwork, handling, and messenger charges . . . Greyhound Corp., Chicago, offers nationwide package express service via buses to more than 25,000 cities and towns. It features 24 hour a day, seven day a week service, with same day or overnight delivery within a radius of 500 miles . . . REA Express is experimenting with rates based on the number of pieces shipped and total cubic volume, rather than the usual weight times distance charge. The company also offers shipper-loaded container service at a flat "per container" rate instead of a weight charge . . . Bliss & Laughlin Inc., Chicago, is profiting from using a newly designed flatcar for shipping cold finished steel bars in special cradles. It replaces boxcars, eliminates bracing and blocking, and facilitates loading and unloading . . . Check the advantages of air freight. On Sept 1, 18 North Atlantic carriers of the International Air Transport Association will introduce a new volume rate structure on transatlantic shipments which will save shippers up to 63 per cent over previous general commodity rates.

Tying Managers' Role to Profits

The contribution is the only real measurement of managerial efficiency, says steel fabricator Leslie Berry

EARLY in 1959, Leslie Berry, president of Southern Engineering Co., steel fabricating firm in Charlotte, N. C., gave this disquieting news to his managers: "Profits are virtually nonexistent. Things can only get worse unless management efficiency is radically improved."

Needed was a sweeping reorganization of executive responsibilities, goals, authority, and communications. "Our objective was to tie down each manager's role and contribution to the prime corporate function—making a profit," points out Mr. Berry.

The payoff: Net profits (before taxes) improved from less than 2 per cent in 1959 to 5.12 per cent in 1960.

Calling in a management consultant, Profit Counselors Inc., New York, to help, here's how Southern Engineering boosted its profits while the rest of the industry's earnings were slumping.

Basic Problems

• **"Functional Vacuums"** — Managers were either living so close to their jobs they suffered from "localism" or else they built "ivory towers" not only for themselves but for their departmental managers. Says Mr. Berry: "Functional vacuums can create havoc. The absence of communications and co-ordination in the sales division, for example, resulted in its efforts not being properly geared to the productive capacities of our plants. That affected the profitability of our overall operation because we had to contend with resulting poor plant utilization, lack of planning of production requirements (including tools and plant layouts), and excessively high direct and indirect labor costs because of poor utilization of labor."

Many managers didn't or couldn't realize that the freewheeling, high profit days were gone. For example, one report showed sales rising 100 per cent in the previous ten years. The fact: While true in dollar volume, sales tonnagewise were up only 13 per cent in the period.

• **Faulty Communications** — Too often specific duties weren't pinpointed. Lack of information exchanged between departments made inventory control haphazard; financial planning difficult.

Action Taken

• **Key Organization Changes**—The executive vice president spot was eliminated and Mr. Berry took over full operation of the company. His philosophy: "The smaller company in its attempt to emulate the successful big company too often succumbs to 'vice presidentitis.' Too often it's just that—a vice! Setting up too many organization buffers between the top man and operations affects management efficiency and profits in that order."

• **Budgetary Controls**—Administrative, sales, and production departments were put on strict budgets. Now, all expenditures are forecast monthly and yearly. That makes department and executive performance appraisal possible on a periodic basis, says Mr. Berry.

• **Management Reports** — Monthly

reports on budget variances (where sales and production figures as well as expenditures are shown in relation to budgeted goals) are issued to key managers. They serve as operating performance guides.

• **Pepped Up Communications**—Weekly meetings are held to improve co-ordination and communications between department heads. Monthly, all operating managers meet to analyze job costs for the preceding month.

• **Market Study**—A comprehensive analysis of industry and company prospects cut down "localism" in management thinking, paved the way for new ideas on diversification. As a result, the company is branching out into new areas (and cutting back in some old, low profit ones); it's retaining its younger managers who now see quicker chance for advancement. Some of the directions diversification and retrenchment have taken:

• The study showed structural steel used in new construction was declining at a steady rate while the use of reinforcing steel was rising. Result: Southern set up a subsidiary, Carolina Rebar Co., to take advantage of the trend its market study forecast. Already the division has become a major contributor to profits.

• Southern Erectors, a wholly owned construction subsidiary that had nearly foundered, was revitalized after it was shown that the market and the knowhow needed to make it an added profit contributor were available. "It just needed management attention," says Mr. Berry.

• Analysis of regional competition showed it had almost doubled in a ten year period and that the capacity of the fabricating facilities in the prior three years had actually exceeded market demand. Result: Unprofitable job bidding. Says Mr. Berry: "We found we had been concentrating on high tonnage jobs involving few manhours. These were easy but marginal profit jobs. A switch in our sales planning has resulted in more profitable job bidding."

• Cut more than $100,000 ($70,000 the first year) from its costs by adopting a methods improvement program recommended by the consulting firm. Involved was a realignment of plant layout and new material handling system and equipment. Says Mr. Berry: "This fat trimming effort by all of us in 1959 put us financially—and even more important, psychologically—in gear for our showdown profit performance in 1960."

• Southern de-emphasized its warehousing operation, a profitable item in past years. A study showed that to meet the competition of "captive" warehouses set up in recent years, a large capital investment would have to be made. "We felt we should not expend either capital or energy in this secondary market," says Mr. Berry.

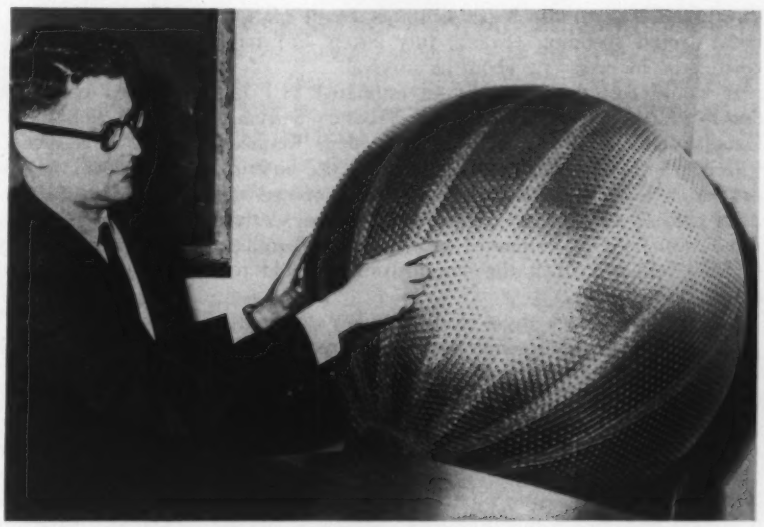
Sums up Mr. Berry: "Our industry is suffering from the shocks of its own evolutionary nature. As steel replaced lumber as the prime building material, some other material, perhaps not yet known, may well replace it. There is still a lumber industry and there will, of course, always be a market for steel. It's up to us, as managers, to make sure we don't get hurt in the shifting sands of an industry settling in place."

How Fast Should Ranks of Scientists Grow by 1970?

THE NATIONAL Science Foundation predicts the total labor force of the U. S. will be 87 million in 1970, compared with 73.6 million today. We'll need about 2.5 million professional scientists and engineers then (vs. 1.4 million working today).

Of today's supply, 87,000 hold doctor degrees. In 1970, we'll need 168,000, says NSF.

While the labor force is increasing at an annual rate of 1.4 per cent, NSF concludes the ranks of professional scientists and engineers must grow at a rate of 6 per cent a year and the doctorate population at a rate of 7 per cent a year.



Foil and Plastic Cut Satellite Weight

AN INFLATABLE satellite model was fabricated from a new Alcoa foil and plastic laminate developed by G. T. Schjeldahl Co., Northfield, Minn. Chemically milled openings in thin foil provide additional weight reduction but retain the structural rigidity of the foil. The new material will be used in huge orbiting balloons for the National Aeronautics & Space Administration's communications satellite program.

These Tax Hikes Deemed Necessary to Help Offset Revenue Loss from Capital Spending Incentives

Tax Proposal	Estimated Revenue Gain
● Taxes on foreign income	$ 35 million
● Dividends, interest withholding tax provision	$532 million
● Entertainment deduction restrictions	$150 million
● Treating gains from sale of depreciable property as ordinary income	$125 million
● Taxes on co-ops, mutual fire & casualty insurance firms	$ 55 million

PROPONENTS of the 8 per cent tax credit plan to boost capital spending (STEEL, July 24, p. 53) have good cause for worrying about its survival.

It would cost the Treasury an estimated $1.1 billion to $1.2 billion in lost revenues. Treasury Secretary Douglas Dillon has warned that President Kennedy will veto any bill which doesn't contain tax boosting provisions to help offset the loss. The proposed tax hikes listed above are considered necessary — they would still leave an estimated net loss of $200 million to $300 million, which the administration would tolerate at present.

But proponents see these storm clouds gathering:

1. The Berlin crisis could force an increase in defense spending which would make the President reluctant to sign a tax bill involving revenue losses.

2. The biggest single source of new revenue suggested is the provision for withholding 16.67 per cent on dividends and interest. The proposal has opposition from "widows living on their dividends to stockbrokers," and the political hurdles will be tough to overcome.

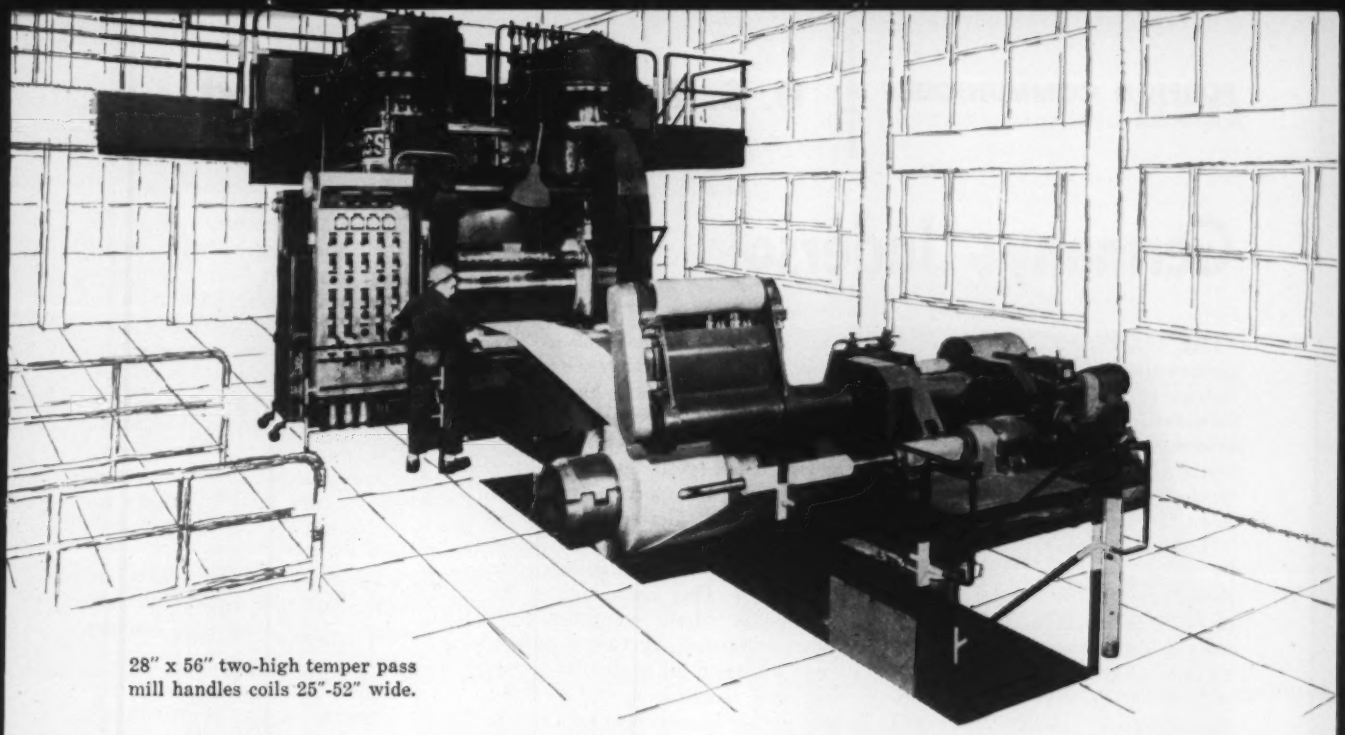
3. Other proposals to hike revenue will come under fire too, including the tax on co-operatives—a strong special interest group to many legislators.

● **NEW TAX BILL**—It now appears that the "$100,000 floor" will refer to tax liability, not spending, and that the credit will be applied in the year that the investment becomes part of the depreciation base, not the year in which the spending occurs. The floor provision is designed as a special incentive to small business. Thus, according to reliable sources, final language will have the 8 per cent tax credit apply to new equipment and up to $50,000 worth of used equipment with a life of six years. A credit of up to 50 per cent of the taxpayer's liability in one year will be allowed. That limitation won't apply to the first $100,000 of tax liability.

Three provisions will affect industry the most on the other side of the ledger. No business expense deductions will be allowed for club dues and fees and business gifts exceeding $25 per year, and travel expenses will be limited to a "reasonable" amount, to be determined by the Internal Revenue Service. The Treasury hopes to gain $150 million in revenue this way.

The Treasury will also gain $125 million a year by treating the gain from the sale of personal property as ordinary income to the extent of depreciation taken. To the extent the gain exceeded the cost of the property, it would be taxed as a capital gain.

A modest $35 million in revenue will go to the Treasury from changes in foreign income taxes. Reacting to U. S. business interests abroad, the House Ways & Means Committee decided to put off until next year any Treasury program to tax foreign subsidiaries of U. S. companies at the 52 per cent corporate rate. The committee has decided to tighten tax standards of Americans living abroad by putting a limitation on the total tax exemption now granted. The exact ceiling hasn't been set.



28" x 56" two-high temper pass mill handles coils 25"-52" wide.

Now 2 new Bliss mills help keep tempers under control at Gary Sheet & Tin

Until last summer, Gary Sheet & Tin tempered "stainless" on the temper mills used for carbon steel. Then to add a new dimension of efficiency, the plant decided to set up separate facilities for stainless and installed a new Bliss temper pass mill to handle it.

Product of Gary and Bliss thinking, the mill takes coils as wide as 52", as narrow as 25"; tempers gages from .008-.150" to an average hardness of 83 Rockwell. Result: this plant of U.S. Steel is now more able to take heavy workloads and special orders in stride.

Another Bliss temper mill is paying similar dividends in Gary's continuous pickling line. Key addition of an April '59 expansion program, this 34" x 76" two-high mill with husky entry and delivery bridles enables Gary to handle strip 18"-62" wide, in thicknesses from .059"-.187". It reduces stock 1½-2%, serving to fracture the scale, thus resulting in less pickle liquor required and higher pickling rate.

Can a custom-designed Bliss mill help you solve a profit-robbing problem? See how the Rolling Mill Division has assisted other plants. Write today for our 84-page Bulletin 40-B.

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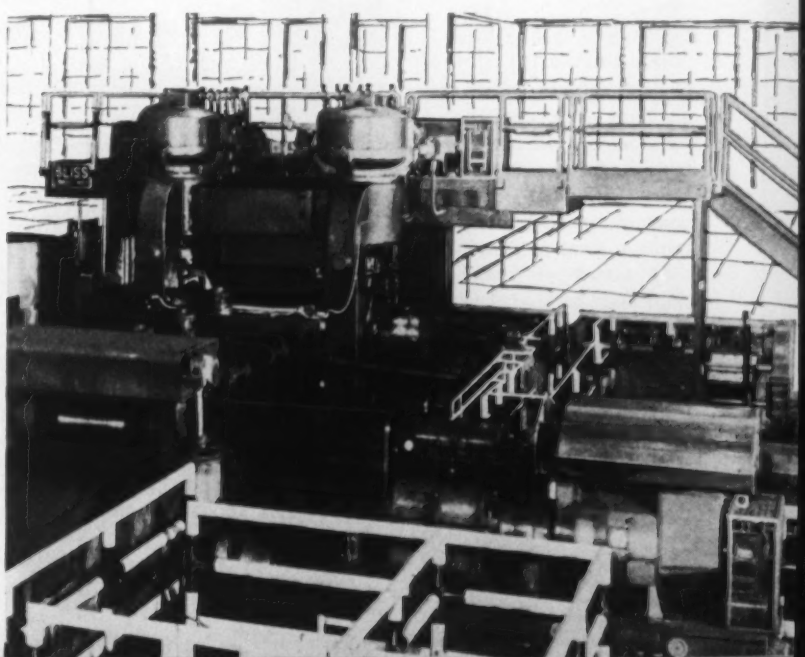


34" x 76" two-high mill in Gary's continuous pickling line descales and tempers at the same time.

Germany: Undersold

"THE INTEREST of German importers in many U. S. products is outrunning the interest of U. S. manufacturers in supplying them," asserts Charles B. Stebbins, Commerce Department official who headed the U. S. trade mission to West Germany.

That observation is substantiated by other members of the mission. Says Richard J. Blum, vice president of New York's Saks & Co.: "The market for consumer goods in Germany is limited only by the U. S. manufacturer's skill in going after the market." Adds William E. Rutz, executive vice president, Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.: "We need more aggressive sales promotion in the German market."

• **How U. S. Fails**—The trade mission drew up this list of U. S. sins that impede our exports to West Germany: 1. Our failure to reply to their correspondence. 2. Our failure to prepare correspondence, operating instructions, packaging, and promotional material in German. 3. Our indifference to the special needs, tastes, preferences, practices, and psychology of the German market. 4. Our failure to quote c.i.f. (cost, insurance, and freight) German ports. 5. Our failure to exploit German trade fairs. 6. Our failure to appoint aggressive agents and offer reliable sales and service. 7. Our credit terms that are stiffer than competitors' in other countries. 8. Our failure to keep informed on market prospects, business conditions, competition, and other factors bearing on successful sales in Germany. 9. Misconceptions on the part of German buyers concerning prices, quality, and workmanship of U. S. merchandise and lack of information about new U. S. products, methods, and technology.

• **What They'll Buy**—"It is quite clear that the opportunities for expanded U. S. trade with Germany, especially exports, are excellent," the mission reports. William F. McClelland, director, corporate market planning, International Business Machines Corp., lists these U. S. products "of particular interest" to German businessmen: Precision measuring and testing equipment of all kinds, radio and TV repair equipment, automatic recording and quality control equipment, material handling equipment, small office-machines, numerically controlled machine tools and other automatic machine controls, automatic form handling equipment, vending machines and coffeemakers, automatic steel mill machinery, wire drawing equipment, and foundry equipment.

Mr. Rutz lists these items as having "strong export possibilities": Machine tools, small metal cutting tools, steel in rolls, flat, and bars, road building and excavating equipment adapted to meet European conditions; plastic materials; metalworking supplies (such as fasteners) in metric sizes; water softening devices, valves and fittings, and equipment for servicing autos and farm equipment. Other items mentioned: Camping equipment, auto accessories, household labor saving devices.

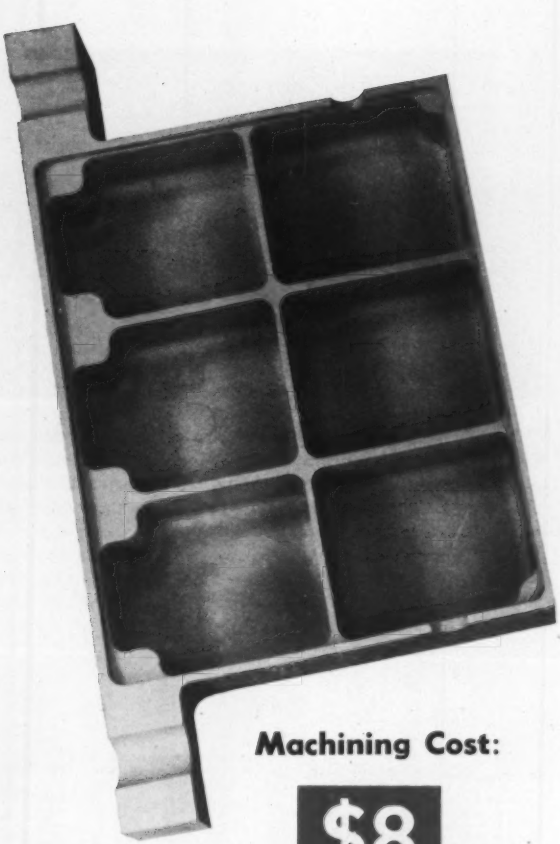
Finland: Underestimated

"FINLAND WILL IMPORT nearly $200 million worth of industrial machinery during the next five years—about half will be machine tools." So asserts William H. Drisko, president, Stone Co., Minneapolis, a member of the U. S. trade mission to Finland.

He says U. S. firms can get more than half of that business if they simply pay the same amount of attention to potential customers there as to those in the U. S. "We don't have to compete pricewise with machinery makers in some other countries. Many Finnish executives are perfectly willing to pay a 25 to 30 per cent premium for U. S. machine tools of the latest design," he asserts. But he adds that the U. S. firm must be willing to grant credit "without a Congressional investigation," must train Finns to sell U. S. machinery, and must do a more effective job of explaining the merits of their equipment. STEEL will present full information on the growing machine tool market in Finland in "Machine Topics" Aug. 7.

Finland has liberal tariffs and no quotas on industrial machinery. The country has eight large metalworking plants (employing 2000 to 4000 each) and 11 shipyards. It also has about 100 small metalworking plants. To be built: An integrated steel mill with a capacity of 350,000 ingot tons. To be equipped: A copper rolling facility. To buy equipment: Three new iron ore mines, the first now being developed.

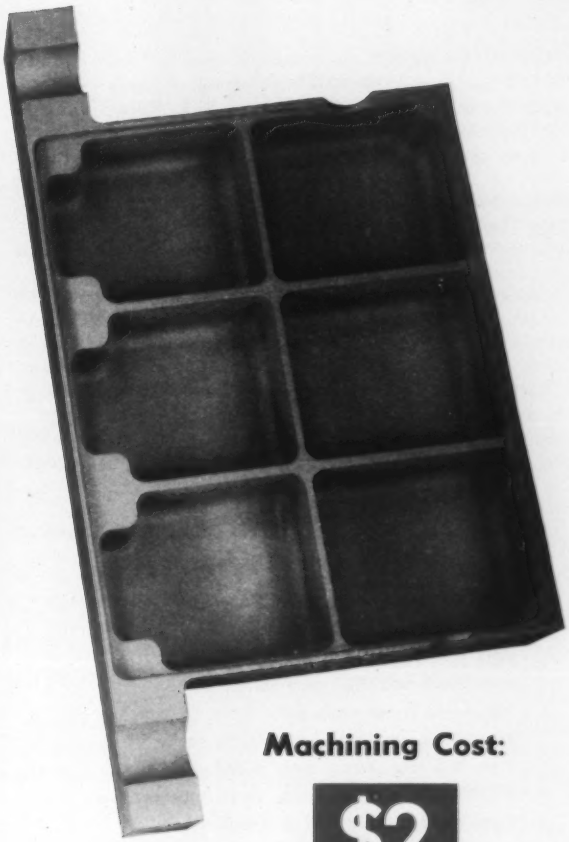
• **Misunderstood Market**—Charles L. Rumrill, president, Rumrill Co., Rochester, N. Y., calls Finland a "misunderstood market." For example, some Americans think the nation is in sympathy with Russia. Though Finland shares 800 miles of border with the USSR, the little nation faces the West. It has long traditions of civil government, finance, and education. Students are required to learn three languages—Finnish, Swedish, and an elective. For the elective, almost 90 per cent take English.



Machining Cost:

$8

From this housing design



Machining Cost:

$2

After slight design changes

This is an example of how to . . .

Design for Profit Growth

A GOOD DESIGN ENGINEER is a man who can do for $1 what any fool can do for $2.

We're talking about the design engineer who applies a usable idea, so it can be converted into a product that's sold at a profit. He's the link between ideas and hardware. We're not talking about the stylist who is also called an industrial designer.

Some 250,000 people function as design engineers in the U. S. today. They may bear one of 50 or more titles, but they all design and develop products. Their numbers have quadrupled since 1950. Editor Colin Carmichael of *Machine Design* estimates that twice as many, or 500,000, will be needed by 1966.

How can you as a manager create the climate and give the assistance needed to stimulate more $1 jobs?

You need to lower or remove three principal hurdles that inhibit good design engineering:

1. The pace of technological change trips some designers and has enlarged and altered the design function.

2. Management too often treats design engineers like bush leaguers.

3. Some design engineers act like bush leaguers by failing to keep up with technical advances.

Changing Design Function

A design engineer's first task is usually to decide how motion will be accomplished and controlled. Classically, many of the functions

For profitable design . . . CONSIDER

HOW MUCH EFFECT does design have on your profits? Production people contend that many of their problems could be avoided by better design. R. R. Miller, president of Precision Metalsmiths, Cleveland, puts it this way: "Costs, quality, and delivery are designed into parts before we cast them." Time and again, STEEL editors get this answer to the question: "Do your thinking in the design stage, planning on the material, the process, the finish and the delivery that you require. Pencil mistakes are easier to correct than metal mistakes."

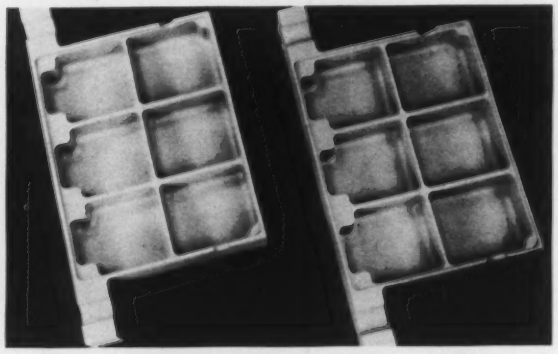
If you believe that "no one has ever made a good part from a bad design," how do you go about it? One recurring theme runs through all recommendations—check with the manufacturing people before the design is frozen. Overdesign means the part is expensive—but underdesign is costly when service problems crop up. The designer is the final arbiter for tolerances on dimensions, but he may be able to drop dollars out of costs by wider allowances in noncritical areas.

He'll need to ask these questions:

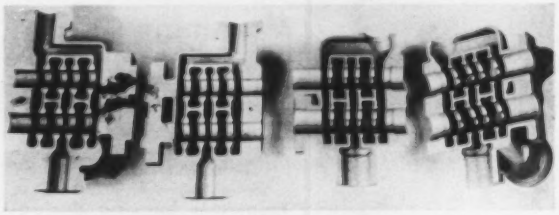
What will the product do?
When and where will it be used?
Who will use it and why?
How much will they pay for it?
What will it be made of?
What processes will be used to make it?
How big and strong must it be?
What work and efficiency must it achieve?
How much power will it need?

That sounds like a job for a superman. It would be, if the designer were to know all the details of all materials and processes. But he doesn't need to know; he can ask plant people, material suppliers, outside venders. In some cases, reference books can help, but beware! In fast changing areas of technology, the books may be partially out of date by the time they're printed.

Here are some examples of good and bad design practices, showing the evolution of improvements. They are taken from the casting field, but similar case studies can be prepared in any area.



The electrical equipment housing is for a commercial job. Originally, considerable machining had been done on the outer surfaces, and the hole areas on the ears had been drilled and reamed. The hole through the thin wall had been chamfered after sizing. With the changes suggested by the supplier, machining costs will drop about $6 from the original (more than $8) price. It's done by using cast surfaces, thinner walls, casting the holes closer to size, and casting the chamfer in place.



The original version of this hydraulic valve body left considerable metal to be machined. So much, in fact, that shrinkage porosity could occur. The redesign cut out much of this metal, took advantage of the close tolerances possible in the investment shell process to eliminate all but final machining steps. The new design saves money, is lighter, cuts machining time—and eliminates the shrinkage problem that caused high reject rates on x-ray inspection.

---

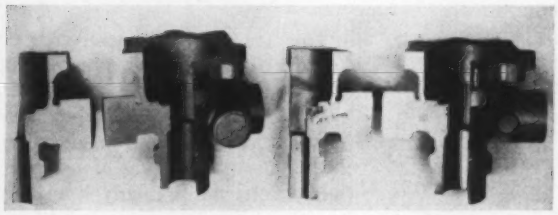
were done mechanically. Now electronics is taking over and bringing new problems. Management needs to recognize the evolution and find people with skills never before associated with design in industry.

No longer is a man competent if he can only design shafts, drives, and the other traditional means of accomplishing and controlling motion. Now he needs to know about electronics, nucleonics, and other arcane subjects.

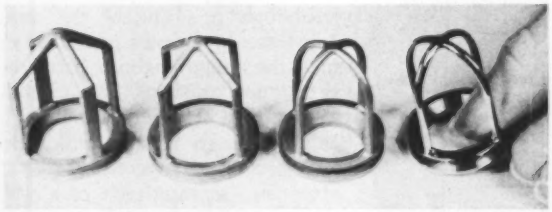
We're operating increasingly in design engineering with specialists working under the supervision of a project engineer. He has the broad, general knowledge. Experts suggest that specialists be available to more than one project engineer to give greater flexibility and efficiency to the organization.

George Fried of the corporate engineering staff (Stamford, Conn.) of American Machine & Foundry Co., advises building a convertible engineering organization that can be shifted to meet the changing needs of projects, particularly the big ones.

The design engineer's workload alone creates formidable barriers to good performance. *Machine Design* reports that 71 per cent of the metalworking companies replying to a survey had a completely new prod-



Making the part lighter may be a mistake. It worked for the hydraulic valve, was the wrong way to go for this part. Here, the heavy boss on the side permitted good feeding in the other heavy section. When it was reduced, shrinkage porosity developed. If the smaller boss has other design advantages, changes in gating practice may eliminate the porosity; the price is more complexity in the casting process, and that will reflect in dollars and cents to the user.



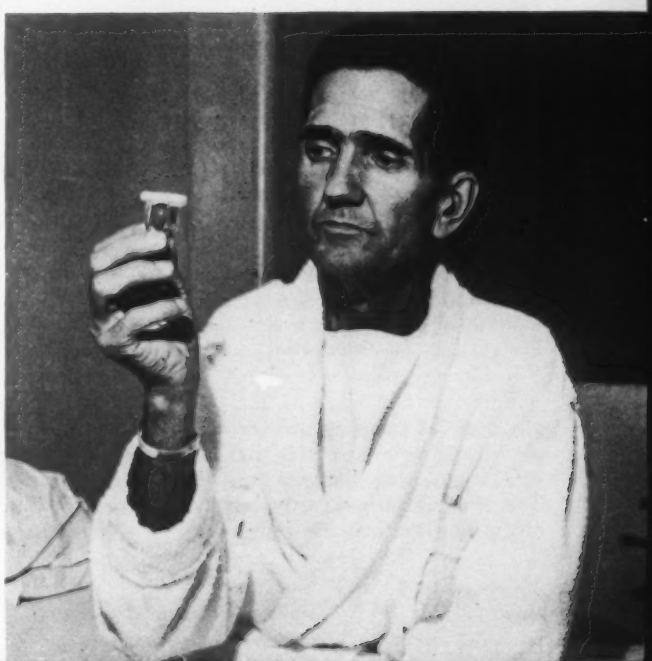
The cage shown is part of an artificial mitral (heart) valve. Evolution of the design for lighter weight and smoother contours is apparent. In the cage, in the finished valve, is a silicone rubber ball. A plastic fabric around the valve seat permits anchoring the valve in position. First person to have the artificial valve installed was Philip Amundson, Spokane. (Photo at right.) By an operation performed in 1960, the valve replaced a mitral valve irreparably damaged as an aftermath of rheumatic fever. The valve was developed by H. Lowell Edwards, Portland, Oreg., and Dr. Albert Starr, assistant professor of surgery at the Oregon Medical School, Portland.

Says Mr. Miller, "There isn't a 'universal design' appropriate or economically suitable for all metal fabricating processes." His suggestions to those considering precision casting apply to other fields of design. Here they are:

- **By design, you can eliminate excess weight and reduce rejects. In the preliminary stages, show the functional areas on the print and let the fabricator consider them on the basis of value analysis.**
- **Review quality standards. Eliminate "overengineered" specifications.**
- **Be realistic about dimensional tolerances; either "too tight" or "too loose" can cause extra costs.**
- **Purchase good tooling. It can save production manhours.**
- **Relate design to the method of production. Don't request a foundry to quote from a print designed for a weldment—or vice versa.**
- **Know the standards for processes and materials. One source: Technical societies. Change is rapid. What's being done today may surprise you.**
- **Use prototypes to check out design, functions and costs before final tooling for production.**
- **When picking a material, consider the use to be made of the product, but don't forget to relate the material to the production process.**

Visit the production area. See how other parts are being made, talk to suppliers and ask for ideas.

It takes thought, planning, knowledge, and work to design for profit growth. And in our changing technology, no specification can be considered final.



uct in some stage of development during 1960; 66.5 per cent so reported in 1959. And 74.3 per cent expect to make changes in standard products this year vs. 74.7 per cent in 1960 and 69 per cent in 1959.

Managing the Designers

Besides recognizing and preparing for the profound changes going on in the design engineering

function, your job as a manager is to provide leadership for the designers.

You can do the basic things of providing fair salary administration, adequate status, good working conditions, and guidance on management's cost goals. But you need to do still more.

Dr. Philip Marvin, manager of American Management Association's Research & Development Division, suggests in *Machine Design* that you should be able to answer "yes" to each of these questions:

1. Can effective design engineering decisions be made?

Engineers must be positioned in such a way that they can make effective decisions. They must have the essential information at their disposal, the capacity to use the information, and enough time to make the decision.

2. Are operating areas specialized?

Do jobs overlap? Are responsibilities clearly defined? Do designers understand their jobs?

3. Has authority to act been granted?

Pinpoint individuals who have the power to act. For each, list the activities he can initiate. Determine the degree to which his authority coincides with the decisions he makes. The two should always match.

4. Are reporting relationships effective?

You don't lose control by delegating authority—if you clearly define reporting relationships and offer advice and guidance only when it's needed.

5. Are workloads uniform?

Light loads are as bad as excessive ones.

6. Is equilibrium established?

Once you set your design engineering pattern, departures for special situations should be clearly recognized as temporary.

7. Can changes be made easily?

A "yes" to No. 6 and 7 is not inconsistent. When new conditions arise, your organizational setup must meet them, whereupon a new equilibrium can be established.

8. Can expansion take place?

This question relates to the previous two. A common problem with an expanding company is that design engineering hampers growth. The situation arises partly because of the shortage in some design specialities and in good design generalists, and it also results from the methodical and perfectionist traits inherent in many engineers.

9. Is complexity minimized?

Keep organizations as simple as possible. Complexity usually develops from failure to renovate organizations in adjusting to new conditions.

10. Is staffing adequate?

This question is already partly answered if the first nine have been studied. Enough technicians should be on the staff to handle the subprofessional work.

What personality traits does the normal engineer have? Eugene Raudsepp, director of psychological research with Deutsch & Shea Inc., New York, reports in *Machine Design* that the engineer rates high in cautiousness and perfectionism. He ranks high in work enthusiasm, conformity, professional ambition, and the ability to work under pressure. He is moderately self-confident, ingenious, and imaginative. He is low in sensitivity to people and in persuasiveness, communication skills, tact, synthesizing and decision making abilities. He is very low in diplomacy, introspectiveness, and in his tolerance for the intangible.

Mr. Raudsepp believes you'll do a better job of managing the design function if you take these engineer wants into account:

1. Programing and scheduling of his work assignments, clear objectives, and detailed planning.
2. A set, but not routine, pattern to follow.
3. Competent supervisors.
4. Adequate credit in the form of compensation, status, and security from his company for his ideas and accomplishments.
5. Opportunity to influence work and follow through on technical projects he has started.
6. Participation in decisions which affect him.
7. Freedom to maintain an independent attitude on how to tackle any problem.
8. Challenging and varied work assignments.
9. Information on how his work fits into the entire project.
10. Adequate aid and facilities to get the job done.
11. Clearly defined authority and responsibility.
12. Employment in a company that is known for its excellent products and reputable professional staff.

Improving the Designer

This should be a do-it-yourself project, but the encouragement must come from you as a manager.

Many companies find they give impetus to self-improvement when they allow the reading of technical publications on company time, pay the dues in technical societies, and grant total or partial refunds on the tuition for educational programs. Tuition refunds can:

- Lead to an advanced degree through accredited courses.
- Stress fundamentals rather than company centered specifics.
- Stimulate crossfertilization of ideas with engineers from other companies.

Keystone

Although he's one of the most anonymous performers in industry's ranks, the design engineer holds the key to your costs and thus to your profit growth. His increasingly difficult task needs your co-ordination and enlightened supervision.

Here are some criteria of a well designed job:

1. It performs its function with sufficient reliability.
2. It gives adequate life.
3. It can be produced in the right quantity and at the right price.
4. It has customer appeal.

American Machine & Foundry Co. is fond of saying its products are "better—by design." The concept of intention and purpose is the key to the design engineering function.

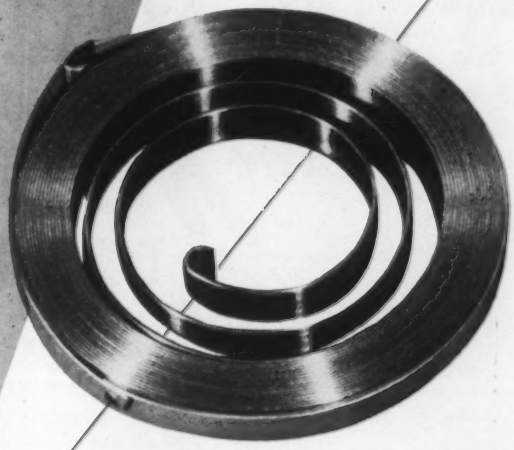
PLAN FOR PROFIT GROWTH

Reliability and Profit Growth

On Aug. 14, STEEL will show why reliability is vital to all metalworking, not just the missilemaker. We'll demonstrate how to achieve more dependability. For a free copy of any or all articles in this series (appearing biweekly since Jan. 16), write: Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

SANDVIK 11R51 STAINLESS STEEL

A Proven Solution To These Spring Problems



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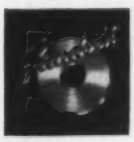

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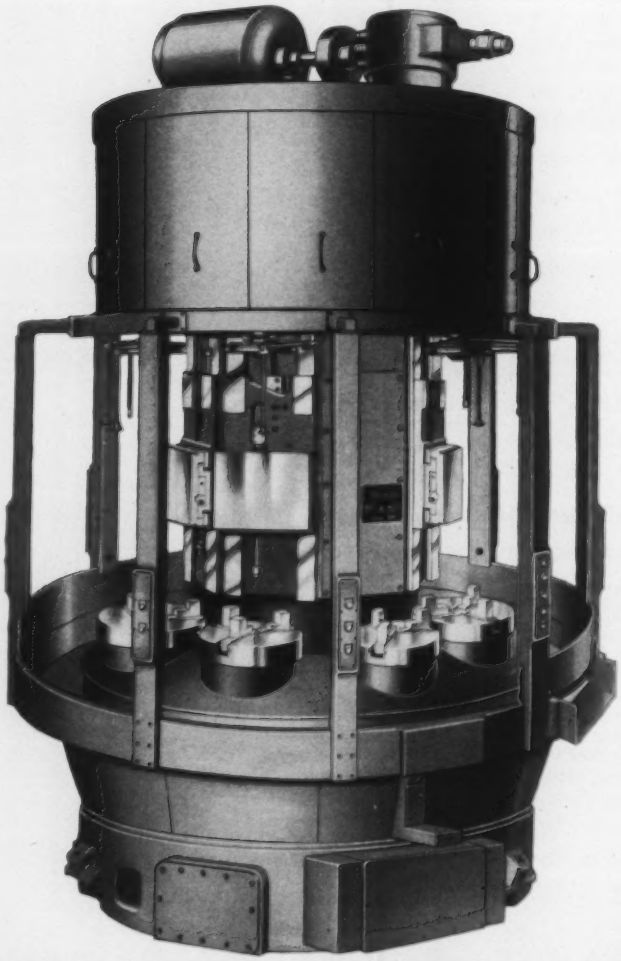

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Autodom's Challenges in the '60s—No. 3

Manufacturing executives seek . . .

More Flexibility at Less Cost

Increase flexibility . . .

BECAUSE present mass production methods and techniques are generally tailored to handle high volume manufacture of parts, the most challenging manufacturing problem is to provide sufficient flexibility in production to meet the ever increasing customer demand for wide product variety and selectivity. Such flexibility must be accomplished with reduced cycle time from product concept to manufacturing, and with over-all product cost and quality maintained at the levels necessary to meet world-wide competition.

Flexibility is needed because of the continued uncertainty in customer product preferences since World War II and the current challenge by foreign automobile companies with efficient manufacturing facilities to fulfill the consumer demands.

To help solve the problem, we must develop greater depth and coordination in management for the necessary planning and action. We must emphasize programs to determine more precisely the anticipated customer product demand requirements at an earlier date so that more time is available for planning manufacturing flexibility.

Finally, we must concentrate our attention and effort to the initial planning of processes with backing from research and development groups within and outside the company so that the latest technological advancements can be employed.

PETER H. PONTA
Director-manufacturing staff
Ford Motor Co.

Boost productivity . . .

THE MANUFACTURING challenge during this decade will focus on increased productivity.

Studies indicate that although the nation's available work force will increase substantially in this decade, it will be a smaller part of the total population. The number of dependent persons will increase faster than the number employed. The shift in population balance means each worker will have to produce more to support a greater number of dependents.

To combat the imbalance, manufacturers will have to maintain high production levels through increased productivity and advanced technological development. Sensible use of automation, coupled with maximum effective use of our available labor force, are the cornerstones upon which we must build our manufacturing goals. While many persons view automated processes as a detriment to our economic health, they will be a key factor to our survival before the 1970s.

The kind of employees available for manufacturing will change during the 1960s. Studies show that the most desirable group, males 25 to 44 years of age, will decline. The new workers will come largely from the very young, women, and part time employees. The need for flexibility in matching human resources against manufacturing advances will demand flexibility in the application of seniority policies.

ELMER W. BERNITT
Vice president-automotive operations
American Motors Corp.

(*Please turn to Page 42*)

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Challenge of quality . . .

RINEHART S. BRIGHT
Group vice president-automotive mfg.
Chrysler Corp.

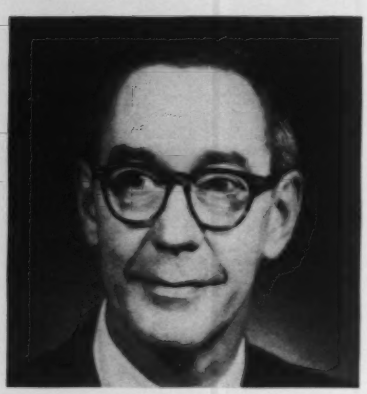
THE AUTOMOTIVE industry's most challenging problem of the 1960s is to improve quality.

We must continue to improve process control rather than rely upon the more conventional inspection technique. It is, of course, impractical to inspect every part that goes into an automobile. To completely check a simple bolt would require 10 to 20 separate operations.

Many control techniques are well established. Others are in the trial stage. New ones certainly must be developed. The techniques fall into three categories: Process or machine capabilities, statistical audits, and automatic monitoring devices either to sort out unacceptable parts or to control the operation.

The improvement in process control will be the responsibility of the quality engineer. He must continually review laboratory and test data. He must also know exactly how the product is performing in the customer's hands. These data must then be directly related to the manufacturing process to determine the type of control to be employed to maintain the level of assurance required. The use of automatic data processing will be a big factor in obtaining the control required.

Reduce costs . . .



PHILIP J. MONAGHAN
Vice president-manufacturing staff
General Motors Corp.

THE CHALLENGE facing the auto industry during the next decade is the never ending probe to build better products at less cost. Throughout the years of automotive history, materials and procedures of handling and shaping materials have been improved. Despite constant progress, we still strive for perfection. That postwar products have improved is evidenced by the number of automobiles more than five years old operating today.

There are further areas of improvement possible in metals and in metal alloys. There is need for improvement in foundry operations and in other methods of forming and cutting metals.

These needs, however, cannot be resolved except by greater emphasis on the part of the men who are charged with responsibility of doing industrial research. In recent years, vast strides have been made in these fields, but much more must be accomplished if we are to make a vehicle with even longer life, almost troublefree, and still priced competitively.

Research and engineering must be conscious of costs which might make adoption of otherwise sound ideas impractical in today's market.

Anticipate demands . . .

A. D. WHITMER
Vice president-manufacturing
Studebaker-Packard Corp.

DETERMINING in advance the rapidly changing desires of the public in models, styling, and engineering is probably the most challenging manufacturing problem in the highly competitive automobile industry.

The problem will be intensified in the years ahead as the population increases and as more features are added to automotive equipment.

The primary factor that complicates the problem is the growing trend toward custom building resulting from lengthy lists of optional equipment. That results in heavy expense and numerous problems involved in large inventories of materials and components.

Establishing limits in the number of models and optional features would simplify the problem, but the motoring public has been conditioned to expect a wide choice in body styles and equipment.

U. S. Auto Output

Passenger Only	1961	1960
January	415,857	688,690
February	364,385	659,298
March	407,959	654,241
April	446,739	582,869
May	542,303	611,260
June	559,474	613,136
6 Mo. Totals	2,736,719	3,809,494
July	.....	434,377
August	.....	305,514
September	.....	407,691
October	.....	617,972
November	.....	597,638
December	.....	523,422
Total	.....	6,696,108
Week Ended	**1961**	**1960**
June 24	128,216	141,247
July 1	125,297	125,868
July 8	85,889	89,769
July 15	127,157	105,113
July 22	105,166†	112,179
July 29	75,000*	107,019

Source: *Ward's Automotive Reports.*
†Preliminary. *Estimated by STEEL.

FIRST ALL-NEW FACILITY FOR THIN TIN PLATE

Wean will build cleaning line for Weirton Steel's expansion

Weirton Steel Division of National Steel Corporation will expand its supply of thin tin plate product for the container market by 300%—marking the first installation of processing equipment specifically designed to treat thin tin plate. The new, high-speed Wean line incorporated in this expansion will clean, chemically treat and oil the light-weight tin plate, which can be shipped to container manufacturers at reduced shipping charges and lower initial cost.

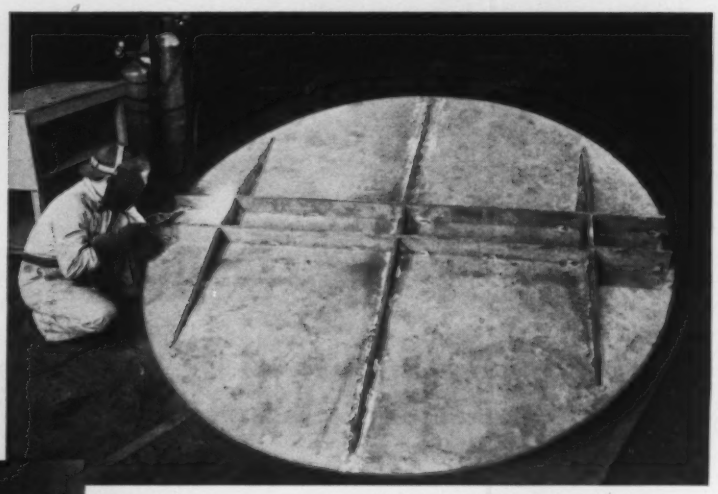
Weirton Steel will be able to handle 60,000 lb. coils on this new line, processing the thin tin plate at speeds up to 2200 fpm. Other features of the line include precision tension control, balanced rolls, and rigid design to assure uniform strip tracking.

This pioneer installation designed specifically for thin tin plate is only one example of Wean's experience in this field. Over 80% of the world's supply of *all* tin plate is produced on Wean equipment—as is the thin tin plate processed by eight of the nine current producers. This unique background of engineering "know-how" can help you in planning your requirements.

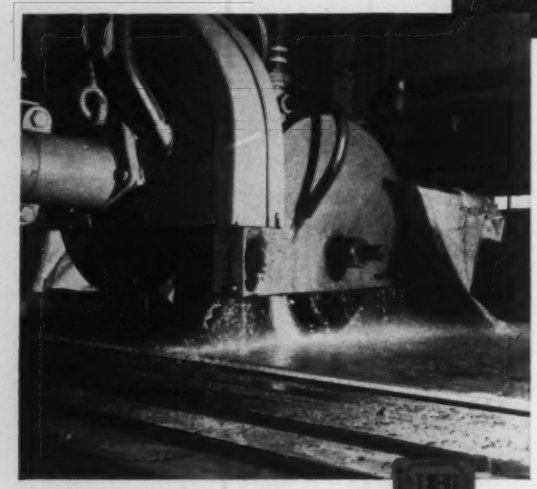
THE WEAN ENGINEERING COMPANY, INC. · WARREN, OHIO

Why It Pays to Apply VALUE ANALYI to Your Stainless Steel Jobs

Here's How It Paid Off for
HENRY PRATT COMPANY
on an Unusual Stainless Fabrication



Welding gusset stiffeners to main damper disc.



Wet-process Ty-Sa-Man sawing gusset plates to finished dimensions. This cutting process eliminates warpage and chance of carbide precipitation.

Engineers of the Henry Pratt Company designed an open hearth stack shut-off damper for use with new air pollution control equipment in steel mill operations. Specifications for the large butterfly valve on this unit called for a multitude of unusual shapes to be fabricated to close tolerances from a special analysis of stainless steel plate. What's more, the production schedule on the first unit was extremely tight.

In this situation, Pratt purchasing agents turned to the House of Stainless. When the job was analyzed, it was found that Chicago Steel Service could supply the specified analysis of stainless plate. In addition, the many varied shapes could be furnished by the House of Stainless in time to meet the tight production schedule and at lower cost. This two-fold advantage was possible because of fully-integrated warehouse services, including engineered layout for maximum material savings, powder flame cutting and Ty-Sa-Man abrasive sawing.

This is just another case of Value Analysis in action on stainless steel requirements. Once again, it reveals how sound purchasing decisions save time, money and materials.

When you apply Value Analysis to your purchases of stainless steel, call on the House of Stainless for metallurgical assistance and prompt deliveries of warehouse quantities or direct mill shipments.

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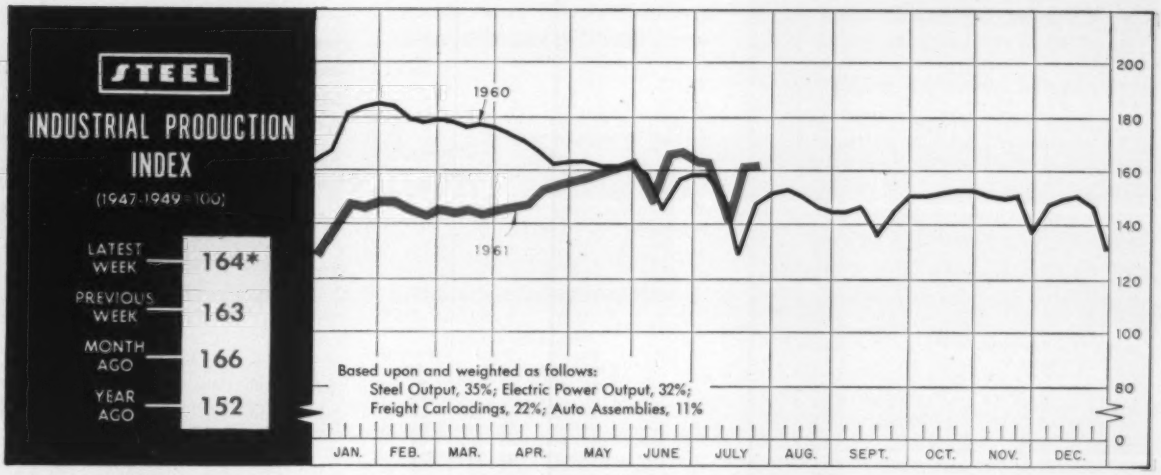


*Week ended July 22.

Uncertainty Creeping into Outlook

NUMEROUS metalworking managers lament that they are not sharing fully in the economic recovery.

As pointed out by STEEL in this column last week, the total economy is already at the prerecession level.

• **Evidence to Contrary**—There is plenty of statistical evidence of the over-all improvement. The Federal Reserve Board's industrial production index is equal to the previous peak (see graph and table, Page 46). Preliminary estimates put gross national product in the second quarter at about $515 billion (annual rate), $10 billion above the previous high, and $15 billion above the first quarter rate. Employment is gradually picking up, especially in manufacturing. (See graph and table, Page 46.) New orders for manufactured goods have been increasing since March.

Evidence that durable goods as a whole are providing the big push is nearly as impressive. Percentagewise, durables have moved up farther than nondurables since the bottom of trough was reached last February. In every component of the FRB index for durable goods manufacturing, gains were marked up in June, the latest month of record. And total durables are only fractionally below the year-ago level—some segments are at all-time highs. The biggest gains in new orders have been in the durables industries.

• **Why the Doubting?**—In the last few weeks, STEEL editors have interviewed scores of top managers in a wide variety of metalworking companies in widely separated parts of the country on conditions within their companies, industries, and localities. Almost without exception, they expressed confidence for the fourth quarter, but puzzlement about all the talk of strenuous recovery now. "The government says things are great, and I read glowing reports in the newspapers," ad-

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)	1,860[1]	1,858	1,520
Electric Power Distributed (million kw-hr)	15,400[1]	15,071	14,425
Bituminous Coal Output (1000 tons)	7,430[1]	1,300	7,389
Crude Oil Production (daily avg—1000 bbl)	6,900[1]	6,930	6,855
Construction Volume (*ENR*—millions)	$509.5	$594.6	$519.8
Auto, Truck Output—U. S., Canada (*Ward's*)	131,915[1]	157,832	140,031
TRADE			
Freight Carloadings (1000 cars)	600[1]	573	620
Intercity Truck Tonnage (changes from year ago)	+0.6%	−0.6%	−3.7%
Business Failures (Dun & Bradstreet)	304	220	258
Currency in Circulation (millions)[2]	$32,634	$32,797	$32,199
Dept. Store Sales (changes from year ago)[2]	+3%	+6%	+1%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$30,145	$28,970	$28,465
Federal Gross Debt (billions)	$289.2	$288.8	$288.8
Bond Volume, NYSE (millions)	$31.5	$31.7	$22.5
Stocks Sales, NYSE (thousands of shares)	13,552	14,845	12,577
Loans & Investments (billions, adjusted)[3]	$112.4	$113.3	$106.7
U. S. Govt. Obligations Held (billions)[3]	$31.5	$32.0	$27.8
PRICES			
STEEL's Finished Steel Price Index[4]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[5]	224.4	224.8	233.3
All Commodities[6]	118.5	118.7	119.6
Commodities Other than Farm & Foods[6]	127.5	127.5	128.3

*Dates on request. [1]Preliminary. [2]Federal Reserve Board. [3]Member Banks, Federal Reserve System. [4]1935-39=100. [5]1936-39=100. [6]Bureau of Labor Statistics Index, 1947-49=100.

mitted one Midwestern metalworker. "But it must be in my competitor's shop, because production here has barely crept up since our low point."

Few companies report that their own operations are anywhere near the all-time peak shown in the production indexes. However, the metalworker who says his business is still going down is also a rarity. Most feel that the bottom has been reached and that any improvement through the summer and early fall will be slow. Orders are coming in a little faster than in the early part of the year, but backlogs are still not large enough to offer a real cushion against any sudden slackening.

• **Stop and Go** — Many company officials report that they were fairly encouraged two months ago because of the pickup in early March and April. But toward the end of May, business slowed and hasn't regained its speed. There is little pessimism because of the change of pace, but there is noticeable disappointment that things aren't as good as expected.

• **Reasons for Concern** — Five reasons are cited most often for the altered attitude.

1. Labor contract negotiations in the auto industry raise the possibility of a strike in another month. While conditions still favor a peaceful settlement, few managers are willing to bet on it and make plans accordingly. Major suppliers report that motordom's purchasing agents are placing orders as if there will be no strike but releases are slow in coming.

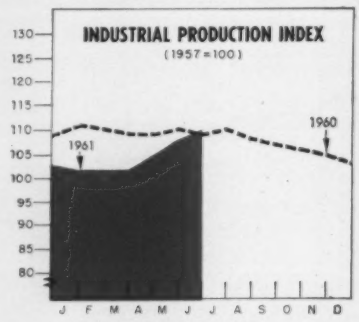
2. The early shutdown of the auto industry also has caused some confusion among suppliers. One Milwaukee supplier told STEEL: "Our fiscal year is going to look terrible because it will include two model changes."

3. The summer doldrums have dampened some of the recovery enthusiasm. But many businessmen claim that even when taking that into account, things still aren't what they should be.

4. The Berlin situation has many metalworkers concerned. One Minneapolis businessman tied it in with the auto negotiations. "Walter Reuther is not dealing from strength this year. But if we go on anything like an emergency footing, you can bet that he will grab the situation and make the most of it."

5. Almost everybody is discouraged about profits. Even if business accelerates as expected in the fourth quarter, earnings are not expected to keep pace. For that reason, some are looking for a smaller pickup in capital goods than the surveys predict.

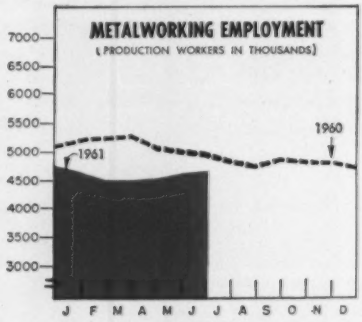
THE BUSINESS TREND



(Seasonally adjusted)

	Total Production 1961	Total Production 1960	Total Mfg. 1961	Total Mfg. 1960	Durables Mfg. 1961	Durables Mfg. 1960
Jan.	102	111	101	112	95	111
Feb.	102	110	101	110	94	109
Mar.	102	109	102	110	95	108
Apr.	105	109	105	109	99	106
May	108	110	108	110	103	107
June	110*	109	110*	110	105*	105
July	...	110	...	110	...	106
Aug.	...	108	...	108	...	104
Sept.	...	107	...	107	...	102
Oct.	...	106	...	106	...	101
Nov.	...	105	...	104	...	98
Dec.	...	103	...	103	...	96
Avg	...	108	...	108	...	104

Federal Reserve Board. *Preliminary.
Charts copyright, 1961, STEEL.



1960	Prim. Mtls.	Fab. Prod.	Machinery	Elec. Mchy.	Trans. Equip.
June	970	840	1,154	859	1,127
July	924	817	1,130	850	1,105
Aug.	910	819	1,112	861	1,036
Sept.	905	835	1,104	877	1,135
Oct.	891	834	1,087	839	1,149
Nov.	871	816	1,087	867	1,153
Dec.	851	794	1,081	844	1,125
1961					
Jan.	838	771	1,075	842	1,068
Feb.	829	755	1,077	835	1,012
Mar.	833	750	1,076	830	1,013
Apr.	845	762	1,081	827	1,018
May	877	787	1,083	835	1,055
June	898	797	1,080	835	1,077

U. S. Bureau of Labor Statistics.

Uniformity Lacking in Upturn

The unevenness of the recovery is noticeable not only industry by industry, but also area by area. For instance, attitudes vary markedly between Minneapolis-St. Paul and Milwaukee.

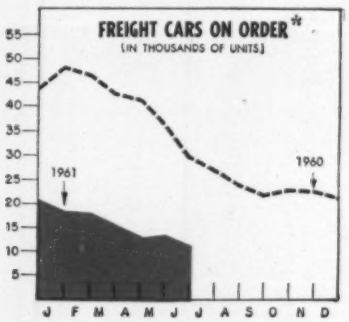
In the Twin Cities, optimism is everywhere. While the pickup hasn't measured up to the FRB index, it has been felt in most avenues of commerce and industry. Unemployment is less than 6 per cent, and the workweek is close to 40 hours.

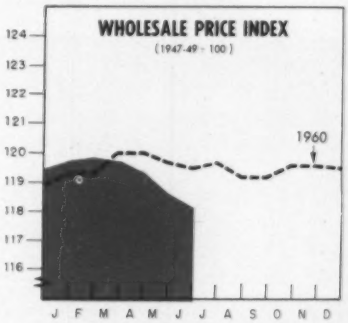
One reason for the feeling of confidence is the variety of industry. Less than a third of the employment is in manufacturing. And many of the leading manufacturing companies—such as Motec Industries Inc., Minneapolis-Honeywell Regulator Co., and Minnesota Mining & Mfg. Co. (3M)—have diversified to eliminate peaks and valleys in production.

J. C. Duke, executive vice president (sales administration) of 3M, told STEEL that the coated abrasive industry has historically led the national economy by a month or two. "Our orders have been on the uptrend for four consecutive months, although there has been a slacking off since the automotive industry started its model changeover."

One cause for concern in this area is the drought that hit the wheat belt. Edmund F. Buryan, president of Motec, said that it is likely to affect late summer farm equipment sales, but the main selling season is over, and it was a good one.

In Milwaukee, the outlook is less certain. In an early July poll conducted by the Milwaukee Association of Commerce, 68 out of 126 firms expected gains in the third quarter over the second, which was only slightly better than the first quarter. But the gains were expected to be small. Thirty-two firms look for no increase, and 26 see declines.





	Domestic Awards		Backlogs (end of month)	
	1961	1960	1961	1960
Jan.	1,339	5,742	18,894	48,170
Feb.	1,536	3,211	18,429	45,323
Mar.	1,796	1,957	15,801	42,131
Apr.	2,040	5,352	13,658	41,003
May	3,666	2,285	13,964	36,106
June	1,214	316	11,821	29,555
July	....	1,331	.....	26,658
Aug.	....	1,333	.....	23,866
Sept.	....	2,206	.....	21,662
Oct.	....	5,864	.....	22,900
Nov.	....	3,740	.....	22,781
Dec.	....	2,705	.....	21,070
Total	....	36,368		

*Domestic only.
American Railway Car Institute.

	All Commodities		Other Than Farm & Foods	
	1961	1960	1961	1960
Jan.	119.8	119.3	128.0	128.8
Feb.	119.9	119.3	128.0	128.7
Mar.	119.8	120.0	128.1	128.6
Apr.	119.4	120.0	128.0	128.7
May	118.7	119.7	127.6	128.2
June	118.2	119.5	127.4	128.2
July	....	119.7	....	128.2
Aug.	....	119.2	....	128.2
Sept.	....	119.2	....	127.9
Oct.	....	119.6	....	128.0
Nov.	....	119.6	....	127.9
Dec.	....	119.5	....	127.9

U. S. Bureau of Labor Statistics.

Perhaps one reason for caution in this area is its heavy dependence on the capital goods industries, which lag the general economy. However, Robert S. Stevenson, president of Allis-Chalmers Mfg. Co., is confident that the upturn in capital spending has begun. He is encouraged by the increase in inquiries—he calls it the "significant development of the second quarter." There is every reason to look for the upturn indicated in the numerous capital goods surveys, he feels.

One sales vice president for electrical equipment agrees that inquiries are up, but he says: "They aren't being turned into orders."

A. O. Smith Corp. officials are confident the low point has been passed, because business has improved to some extent in each month since February. Right now, the company is working on frames for the 1962 cars, so employment is at a fairly good level.

Unemployment in Milwaukee is on a par with the Twin Cities—lower than the national average percentagewise. And most of the statistical measurements of the area's economic health are improving. Despite this, there is a wide feeling all is not what it should be.

Machine Tool Orders Up

Producers of machine tools marked up a comparatively good month in June, but so far in 1961 have been unable to put two good months back to back. The National Machine Tool Builders' Association reports that total new orders last month came to $60.6 million vs. May's $49.6 million. Both cutting and forming type tools contributed to the improvement. Shipments moved up to $64.3 million from $57.9 million the previous month.

NMTBA officials warn against accepting one month's figures as indicative of a trend. They point out that even with the June improvement, first half orders for cutting tools were only 3 per cent ahead of the year-ago period and 7.4 per cent ahead of the recessionary second half of 1960. Forming type tools were behind both the first and second half 1960 totals.

Shipments for the first half of 1961 for cutting tools were below the comparable 1960 period and fractionally ahead of last year's second half. Shipments of forming tools from January through June were ahead of both six month periods last year.

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Where
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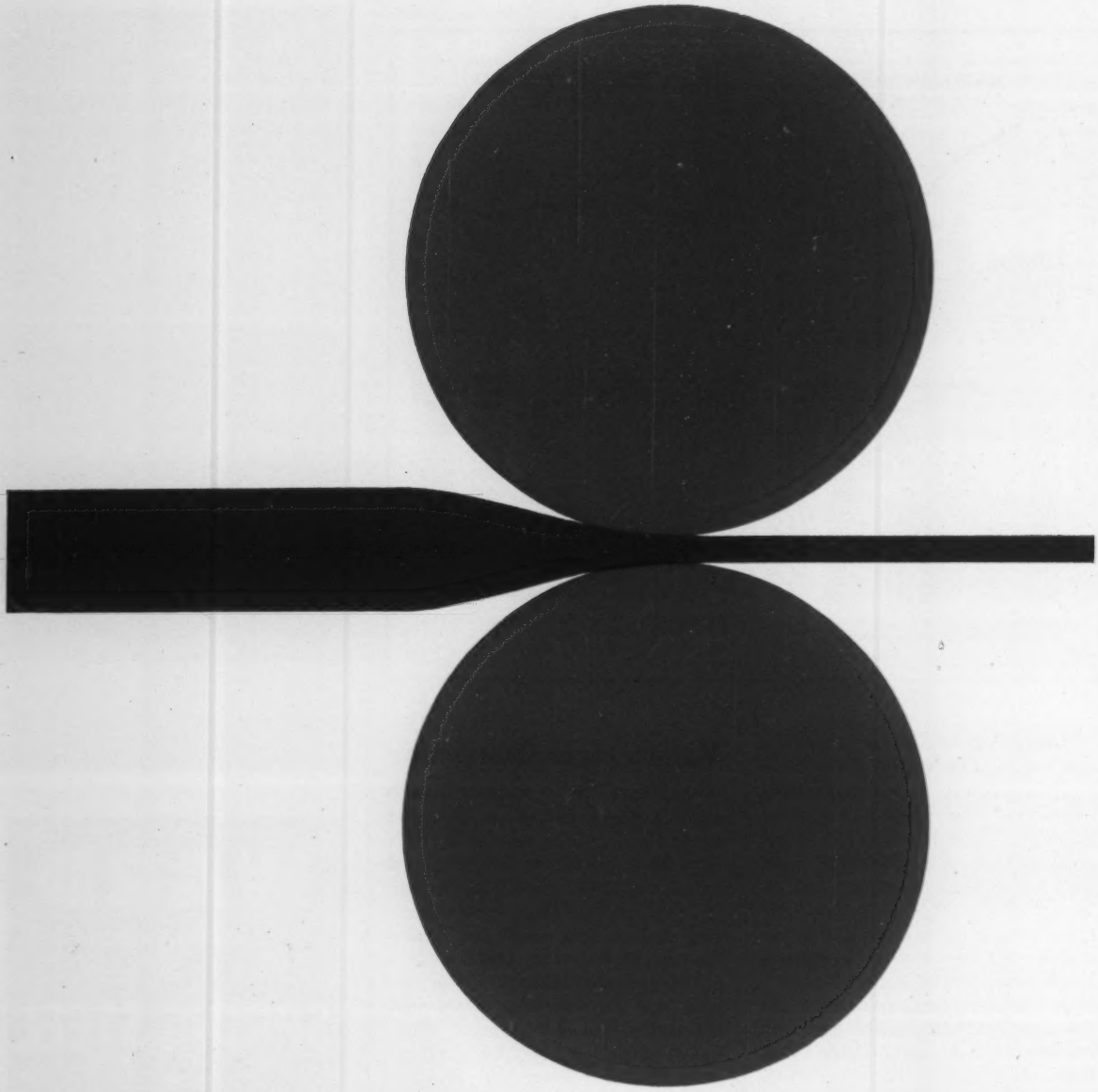

Heppenstall rolls it, cuts it, handles it

Back-up roll sleeves and forged hardened, ground rolls

Crop shear knives

Tongs—stock and custom designed

From melt shop to finished product, Heppenstall equipment plays an important part in modern steelmaking operations. Top-rate performance is provided by Heppenstall's back up roll sleeves and rolls—made from highest quality alloy steel, forged and heat treated to obtain maximum density, grain refinement and controlled hardness. Long on service is the industry-wide reputation of Heppenstall solid tool steel shear knives—for we use our own electric induction steels to assure maximum knife quality. If it has to be handled, Heppenstall tongs can help you. Regardless of shape, weight, or size, Heppenstall tongs can speed materials handling operations with greater efficiency and safety. For experienced Heppenstall service, or specific information, call our nearest Heppenstall Representative or write us direct.

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Buell gen. sales mgr.

PAUL N. GUSTAFSON
Cone-Drive Gears mgr.

JOHN L. WILKES
Mallory Metallurgical sales

J. JAMES OFFUTT
Green Fire Brick exec.

Schaeffer E. Specht was made general sales manager, **Buell Engineering Co.**, New York, and its Northern Blower Div. in Cleveland.

Paul N. Gustafson was made manager, **Cone-Drive Gears Div.**, Detroit, Michigan Tool Co., to succeed **Fred E. Birtch**, retired. Mr. Gustafson was manager of Michigan Tool's Traverse City, Mich., plant. **George A. Schimmin** was made sales manager, Cone-Drive Gears Div.

John C. Crouch was elected vice president of **McKay Co.**, Pittsburgh. He continues as assistant secretary.

Arnold K. Weber was made staff vice president-manufacturing, **Radio Corp. of America**, New York.

Alexander L. Bupp was made director of purchases, **Bucyrus-Erie Co.**, South Milwaukee, Wis. He was director of planning. He continues to direct the firm's commercial evaluation activities.

John L. Wilkes was made general sales manager, **Mallory Metallurgical Co.**, Indianapolis, division of P. R. Mallory & Co. Inc. He succeeds **James L. Nichols**, named manager of Mallory Distributor Div.

Cleaver-Brooks Co., Milwaukee, named **Glenn W. Leupold** to a new post as managing director of foreign manufacturing. In addition, he is in charge of engineering developments.

Francis M. Fives was made vice president and general sales manager of **Elliott Co.**, Jeannette, Pa. He was assistant general sales manager.

William J. Pinkerton was made president and general manager, **Micromatic Hone Corp.**, Detroit. He succeeds **Don S. Connor**, retired because of ill health. Mr. Pinkerton was executive vice president and assistant general manager. **Ray W. Gauss** was made executive vice president-treasurer.

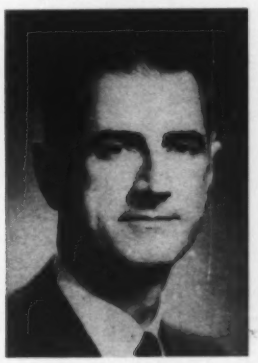
J. James Offutt was elected executive vice president, **A. P. Green Fire Brick Co.**, Mexico, Mo. Since September, 1960, he has been vice president-general manager, responsible for sales, research, and operations. He succeeds **L. J. Miller**, retired.

D. L. Bennett, former division superintendent, Tool & Machinery Mfg. Div., **Acme Steel Co.**, Chicago, was made general manager, Tool & Machine Engineering and Manufacturing.

H. S. Bishop was made manager, Railway Trackwork Mfg. Div., **Midwest Steel Corp.**, Charleston, W. Va. Midwest recently purchased the division, at Huntington, W. Va., from H. K. Porter Company Inc. and moved the manufacturing facilities to a new plant at Pomeroy, Ohio.

Kenneth E. O'Shaughnessy was appointed sales manager, Air-Moving Divisions, **Torrington Mfg. Co.**, Torrington, Conn. He will supervise

ALEXANDER L. BUPP
Bucyrus-Erie purchasing dir.



FRANCIS M. FIVES
Elliott v. p.

WILLIAM J. PINKERTON
Micromatic Hone president

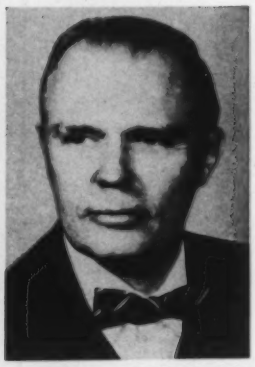
KENNETH E. O'SHAUGHNESSY
Torrington div. sales mgr.

HAROLD J. ZUSKE

ALBERT D. GILCHRIST

Leece-Neville division vice presidents

DONALD E. MOAT



JOHN F. QUEREAU

Leeds & Northrup management changes

sales and field services for both the Connecticut and Indiana plants.

J. S. Allt, vice president-treasurer, assumes additional duties in management of all divisions of **Leece-Neville Co.**, Cleveland. **Harold J. Zuske** was named to the new post of vice president-general manager, Fractional Horsepower Motor Div. **Albert D. Gilchrist** was named vice president-general manager, Alternator & Standard Products Div., also a new post. **Robert G. Hill** was made general sales manager; **William E. Carter** sales manager of original equipment.

Norman A. Matthews was named group leader-ferrous metallurgy of the Research Laboratory of **International Nickel Co. Inc.** at Bayonne, N. J.

O. R. Magoteaux, formerly with National Lead Co. of Ohio, Fernald, Ohio, transferred to **Chas. Taylor Sons Co.**, Cincinnati, subsidiary of National Lead Co. His new duties concern research and development of new processes and products.

Francis M. Miller was made superintendent, Electric Dept., at **Dravo Corp.'s** Neville Island, Pa., plant.

Arthur Lind was made project engineer, Rolling Mill Div., Salem, Ohio, **E. W. Bliss Co.**

Dravo Corp. named **Jack Wade** superintendent for construction of its Stora-Kaldo oxygen steelmaking facility at the Roemer Works of Sharon Steel Corp. in Farrell, Pa.

C. M. Hargraves, manager of the Industrial Equipment Div. of **R. C. Mahon Co.**, Detroit, was appointed a vice president.

Southern Iron & Equipment Co., Chamblee, Ga., appointed **Robert S. Lynch** general manager; **J. O. Harris** assistant general manager; **J. F. Mims** purchasing agent. Mr. Lynch was chairman of Atlantic Steel Co. He recently has been executive vice president of Ford-Lynch Associates.

Donald E. Moat, former vice president-director of marketing, was made vice president-government and foreign relations, **Leeds & Northrup Co.**, Philadelphia. **John F. Quereau**, former vice president-director of manufacturing, was made vice president and director of marketing. **Elwood F. Rogge** was made director of manufacturing.

Hugh Beatty was named to the new post of manager of marketing of the Aerospace Branch, **Librascope Div.**, Glendale, Calif., General Precision Inc.

Charles C. Warne Jr. was made sales assistant to the vice president of **Rockwell-Standard Corp.'s** Industrial Products Group, Coraopolis, Pa.

W. L. Myers and **G. E. Stults** were made assistant sales managers at Detroit for **Republic Steel Corp.**

Jack D. McDaniel was made assistant manager-sheet and strip sales for **Kaiser Steel Corp.**, Oakland, Calif.

Graham B. Brown joined **Stauffer Chemical Co.** as general manager, Metals Div., Richmond, Calif.

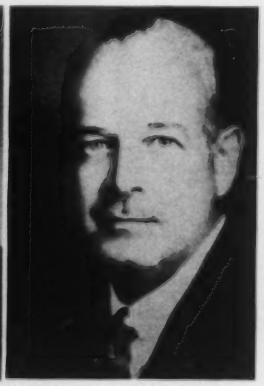
C. J. Weber was named assistant manager; **A. C. Chiazza** sales manager of **Westinghouse Electric Corp.'s** Aerospace Electrical Dept. at Lima, Ohio.

Albert J. Wein was made manager of **Steelmet Inc.'s** Nonferrous & Nickel Alloy Div., Pittsburgh.

Bert Fleming was made senior manufacturing engineer, electromechanical devices, for **Daystrom Inc's** Military Electronics Div., Archbald, Pa.

O. R. MAGOTEAUX
joins Chas. Taylor Sons

C. M. HARGRAVES
R. C. Mahon v. p.



ROBERT S. LYNCH
Southern Iron gen. mgr.

Raymond A. Frick and **Victor L. Persbacker** were elected vice presidents of **American Brake Shoe Co.**, New York, and were named to the management committee. Mr. Frick also was named group executive for railroad products. Mr. Persbacker continues as comptroller. Mr. Frick was executive vice president, Railroad Products Div. He succeeds **Stephen S. Conway** (retired) as group executive and division president Aug. 1.

Earl Langenberg was made chief engineer, **Keystone Steel & Wire Co.**, Peoria, Ill., to succeed **John Newell**, retiring Dec. 31. **John Buehler** replaces Mr. Langenberg as assistant chief engineer. **William Herman**, former rolling mills superintendent, has retired.

J. R. Connell was named general manager, **Green River Steel Corp.**, Owensboro, Ky. He was administrative assistant to the president of Jessop Steel Co., parent company. **G. E. Cassidy** was made general manager-operations. **George H. Chubb** was named general sales manager.

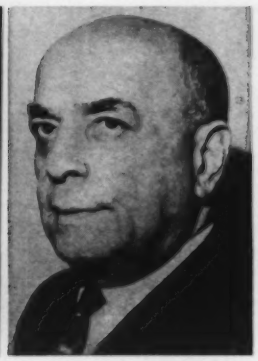
J. D. Reid was made manager of aluminum sales by **Hill-Chase Steel Co.**, Baltimore.

Carl E. Johnson was made division sales manager, **Sparton Automotive Div.**, Jackson, Mich., Sparton Corp.

Robert L. Wicker was made manager of distributor sales, **American Hoist & Derrick Co.**, St. Paul. He was general sales manager of Dart Truck Co., and more recently served in the same capacity with Bros Inc., Minneapolis.

RAYMOND A. FRICK
American Brake Shoe v. p.

JOSEPH M. ENGEL
Republic metallurgist



JACK KAYE
Luria International v. p.

Joseph M. Engel was made chief metallurgist for the Buffalo steel plant of **Republic Steel Corp.** He joined Republic's Metallurgical Dept. in Buffalo in 1939, and since 1953 has been assistant chief metallurgist.

James R. Higgins was made purchasing manager-metals for **Olin Mathieson Chemical Corp.**, New York.

Howard J. Atkinson was promoted from regional sales manager to general sales manager, **Brookfield Wire Co. Inc.**, Brookfield, Mass.

E. M. de Windt, vice president of **Eaton Mfg. Co.**, Cleveland, has also been named president of the newly established Eaton International Div., which consolidates Eaton's foreign activities.

Robert Linquist was appointed vice president - engineering, **Security Valve Co.**, South Pasadena, Calif., subsidiary of Menasco Mfg. Co. He was chief engineer, Annin Co.

Jack Kaye was elected vice president, **Luria International Div.**, Luria Bros. & Co. Inc., New York, division of Ogden Corp.

Jack T. Gentry was made vice president, **U. S. Engineering Co.**, division of Litton Industries, Beverly Hills, Calif. He continues as general manager.

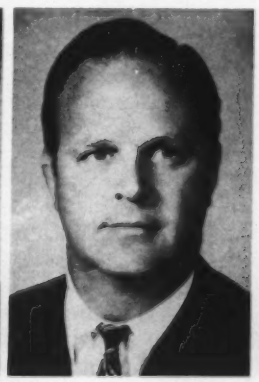
Frank J. Bednarczyk was made chief quality engineer, **SKF Industries Inc.**, Philadelphia.

Kaiser Aluminum & Chemical Corp. named **Robert F. Buechner** manager of its integrated primary aluminum and fabricating works at Ravenswood, W. Va.; and **J. H. Williams** manager of its Trentwood, Wash., rolling mill. Mr. Buechner succeeds **Charles D. Smith**, transferred to an executive assignment attached to corporation headquarters at Oakland, Calif.

Donald E. Sailer was made manager of manufacturing engineering, Transducer Div., Monrovia, Calif., **Consolidated Electrodynamics Corp.**

Robert Just was named chief industrial engineer at **Indiana Steel Products Div.**, Valparaiso, Ind., Indiana General Corp.

ROBERT L. WICKER
American Hoist sales post



E. M. DeWINDT
Eaton International pres.

ROBERT LINQUIST
Security Valve v. p.

OBITUARIES...

R. K. Turner, 59, a vice president of **Union Carbide Corp.**, New York, died July 18.

W. K. Child, 56, president, **Illinois Iron & Bolt Co.**, Carpentersville, Ill., died July 12.

New Beryllium Plant Lifts Efficiency and Cuts Costs

SUBSTANTIAL reduction in the average price of finished beryllium parts (now about $150 a pound) is forecast by George S. Mikhalapov, president of Brush Beryllium Co., Cleveland. He recalls that only three years ago the figure was around $250 a pound.

A new, $1 million, 90,000 sq ft plant "greatly enhances our efficiency in turning out finished beryllium parts," he adds. It is one aspect of an integrated effort at Brush to lower the cost of beryllium while increasing production capacity to meet growing demands. The new facility boosts the company's fabricating capacity by 50 per cent. When completed later this year, it will represent a $3 million investment in plant and equipment and will replace three smaller fabricating facilities the company operated in Cleveland.

New equipment will include about $200,000 worth of turret, engine, and tracer lathes. A 120 in. King, double ram, vertical boring mill is the plant's largest piece of equipment. A new tracer lathe unit can reproduce forms in beryllium metal to a tolerance of 0.00005 in.

The new plant on St. Clair Avenue near E. 178th Street, Cleveland, is part of an over-all expansion program underway at Brush. The company's Elmore, Ohio, plant is undergoing a $6 million expansion which will more than double its capacity to produce basic beryllium metal. Brush opened a 28,000 sq ft plant last year near Reading, Pa., for the precision rolling of beryllium copper and other alloys. The company also opened a beryllium metal machining plant in Hayward, Calif., to serve missile and aircraft manufacturers along the West Coast.

Herbrand Div. Sold

Bingham-Herbrand Corp., Toledo, Ohio, subsidiary of Van Norman Industries Inc., sold the forging machinery and equipment of its Herbrand Div., Fremont, Ohio, to American Brake Shoe Co., New York. Herbrand will continue to operate in Fremont. The hand tool portion of the business will be transferred to another Van Norman Industries plant.

Braden Copper Expanding

Braden Copper Co. has launched a $6 million project to increase the productive capacity of its mine, mill, and smelter facilities near Rancagua, Chile. Annual capacity will be raised to 191,200 tons of copper.

Kaiser Engineers International, Oakland, Calif., will provide engineering, procurement, and construction management services throughout the program which will be completed by Dec. 31.

Lath Plant Enlarged

Alabama Metal Lath Co., Birmingham, is adding 32,000 sq ft to its 85,000 sq ft plant. Cost, including equipment: About $1 million. The addition is scheduled for completion in September.

Thompson Wire Expands

Thompson Wire Co., Sparrows Point, Md., has completed installation of two additional portable bell, gas fired annealing furnaces and six more furnace bases. The firm produces steel strip. William Dockendorff is plant manager.

Joy Mfg. Consolidates

Joy Mfg. Co., Pittsburgh, will expand some of its larger facilities, relocate several activities, and close two small plants, says W. L. Wearly, president. The steps will conclude a two year program to achieve greater operating efficiencies by consolidating operations at fewer locations.

About 20,000 sq ft of office space will be added to the Coal Machinery Div.'s engineering center at Franklin, Pa. About 30,000 sq ft of manufacturing space will also be constructed at Franklin.

The manufacturing and engineering activities of Joy's subsidiary, Compton Inc., will be moved from Clarksburg, W. Va., to Franklin. The Coal Machinery Div.'s Conveyor Dept. will be moved from New Philadelphia, Ohio, to Franklin.

The space made available at New Philadelphia plus a 35,000 sq ft expansion will permit moving the company's Electrical Products Div. from St. Louis to New Philadelphia.

Production at the Claremont, N. H., plant will be increased by the addition of gear and chain manufacturing.

Joy's Baash-Ross Div. has achieved major economies by concentrating six, scattered, oil tool manufacturing operations into two major locations: Long Beach, Calif., and Houston.

Air Products Opens Plant

Air Products Inc., Allentown, Pa., has placed on stream its $6 million plant in Granite City, Ill., with a daily capacity of more than 170 tons of liquid and gaseous oxygen. Production, purification, and storage facilities provide tonnage quantities of liquid and gaseous oxygen, nitrogen, and argon; and gaseous acetylene, hydrogen, and helium. The plant's principal customer is Granite City Steel Co. which recently completed an expansion program.

Research Center Planned

The National Bureau of Standards is building research facilities near Gaithersburg, Md., to house its Washington staff. The $104 million installation will consist of about 20 buildings, including administrative, office, special and general purpose laboratories, and service buildings. Construction is to be carried out in successive stages as appropriations are made available by Congress. The first two buildings being constructed are the engineering mechanics laboratory and the boiler and refrigeration plant; construction of the third, a radiation physics laboratory, is expected to be started later this year. The first three buildings are scheduled for completion in 1963.

Vulcan to Build Plant

Vulcan Mold & Iron Co., Latrobe, Pa., will construct a $7.5 million ingot mold manufacturing plant on Fort Road, Trenton, Mich. The main building will have about 170,000 sq ft of production floor space. The plant will have an initial annual capacity of about 180,000 tons of ingot molds. Rust Engineering Co., Pittsburgh, is the project engineer and will contract and supervise construction.

Koppers to Repair Ovens

Engineering & Construction Div., Koppers Co., Pittsburgh, will make major repairs to two coke oven batteries at the Indiana Harbor (Ind.) Works of Inland Steel Co. Each battery has 73 Koppers-Becker underjet ovens. Fieldwork is expected to begin in October and completion is expected in late 1962. The Indiana Harbor Works has seven coke oven batteries with a total of 531 ovens.

Annealing Line Ups Gary Mill Output

INSTALLATION of this high speed, continuous annealing line, coupled with present box annealing facilities, enables U. S. Steel's Gary (Ind.) Sheet & Tin Mills "to provide every type of tin plate production required by can manufacturers," says E. H. Gott, executive vice president-production. The line handles cold reduced strip coils ranging from 22 to 38 in. in width.

CONSOLIDATIONS

Golden-Anderson Valve Specialty Co., Pittsburgh, purchased **Rotary Valve & Engineering Corp.**, Birmingham, manufacturer of circular rotary valves and linear valves for high pressure and high velocity applications. The subsidiary has been renamed Rotary Valve Corp. and operations have been moved to Pittsburgh.

Mathews Conveyer Co., Ellwood City, Pa., purchased **Wilkie Co.**, Philadelphia, maker of telescopic roller, wheel, and belt conveyors. John McLaughlin is general manager of the Wilkie operation.

J. B. Williams Co. Inc., Newark, N. J., acquired **Landers, Frary & Clark**, New Britain, Conn., maker of electrical and household appliances. M. B. Rosenhaus, president and chairman of the Williams firm, has been elected to the same positions in the New Britain firm.

Chemical Contour Corp., Gardena, Calif., acquired **Empcor**, Burbank, Calif., manufacturer of etched circuit boards for the electronics industry. Tracy T. Day has been elected a vice president of Empcor and will be general manager.

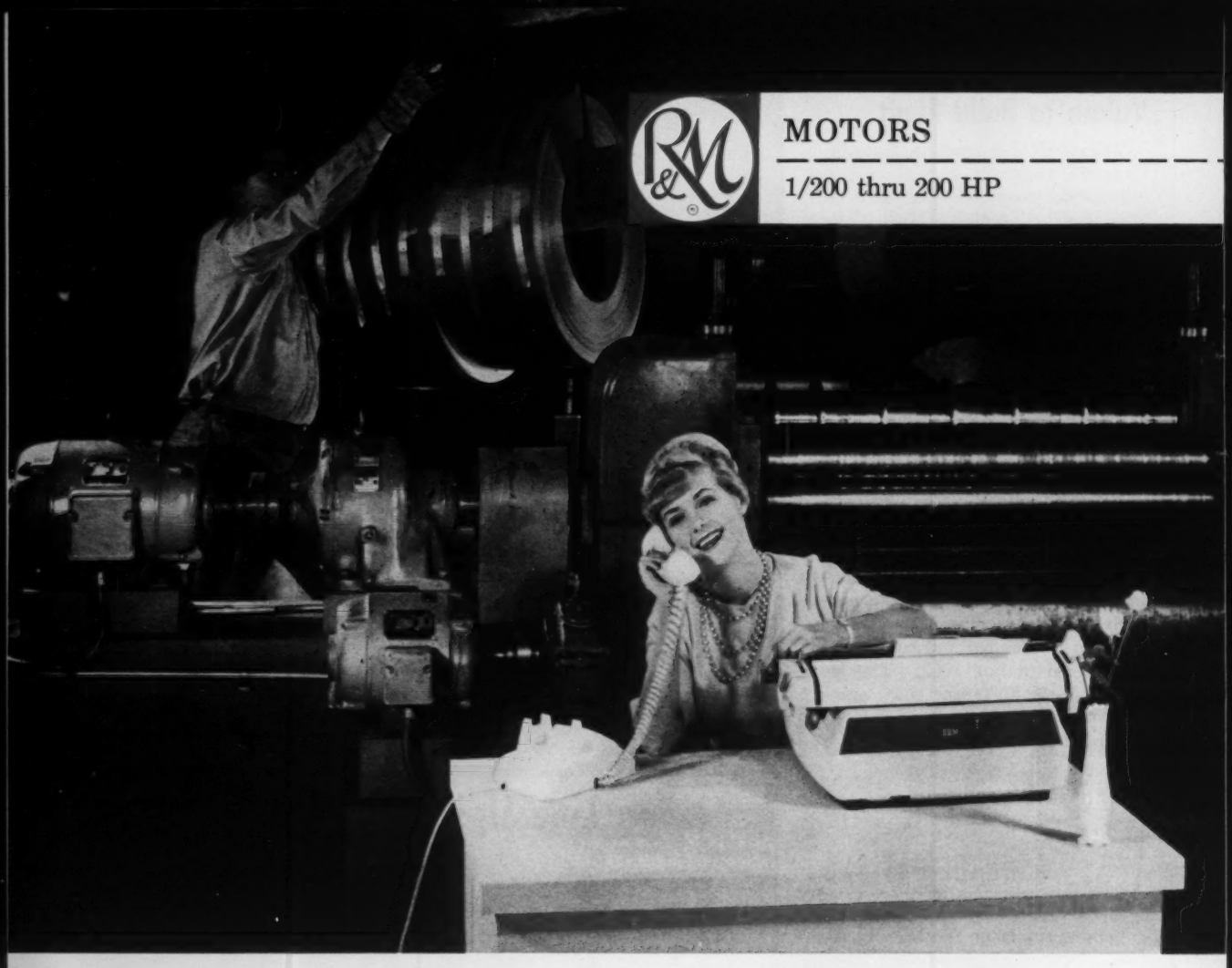
R. M. F. Inc. acquired **Fab Tool & Mfg. Corp.** and moved operations to 195 Allwood Rd., Clifton, N. J. A. F. Fabiano has been named vice president in charge of operations at the plants in Clifton and King of Prussia, Pa. The company makes missile motors and related hardware, electronic components, and precision metal parts.

Coleman Engineering Co. Inc., Los Angeles, acquired **Speed-D-Burr Corp.**, Wilmington, Calif., metal product finisher and producer of finishing compounds and finishing machinery. The 10,000 sq ft plant of Speed-D-Burr will be more than doubled in size to house operations of Coleman's Engineering Div., now in Torrance, Calif.

NEW PLANTS

Wheeling Corrugating Co., subsidiary of Wheeling Steel Corp., Wheeling, W. Va., will construct a culvert fabricating and bituminous dipping plant at Jeffersonville, Ind. The $500,000 installation is scheduled to be completed this fall. The company is building a similar plant at Havana, Ill.

Fenwal Inc., Ashland, Mass., is erecting a 106,000 sq ft building on Leland Avenue, that city, to house major portions of its engineering and manufacturing departments. The plant will contain all Fenwal heavy production machinery, light assembly areas, engineering offices and laboratories, and executive offices.



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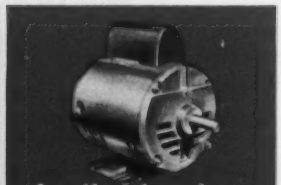
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Subsidiary companies at: Memphis, Tenn., Pico Rivera, Calif., Brantford, Ontario.

ION ENGINEWORK—The National Aeronautics & Space Administration will negotiate a contract with the Astro-Electronics Div., Radio Corp. of America, for the development of a payload capsule to test ion engines in space. The engines would propel spacecraft with electrically charged particles expelled at high velocities by electric or electromagnetic fields. The contract calls for seven capsules, three for ground tests and four for space flight. The engines will operate at low temperature, are small, use little fuel, and can be reignited during flight. The engines could operate for years in space, says NASA.

RADIOACTIVE TATTOO—Stainless steel tubes are being used for heat exchange tube banks in Sweden's R3/Adam power producing nuclear reactor. The first such unit for Sweden, it will be of 70 megawatt capacity. A radioactive isotope is incorporated in the steel (an austenitic alloy with a maximum carbon of 0.03 per cent, low cobalt, and 0.05 per cent nitrogen) to permit positive identification of each heat. Finished tubes are inspected ultrasonically.

WELDING ENGINEER OF TOMORROW—"Within the next decade, we will see a new kind of welding engineer trained by the welding industry itself to handle the increasingly wide variety of more and more specialized welding processes," states A. Lesnewich, supervisor of welding research, Air Reduction Sales Co., a division of Air Reduction Co. Inc., New York. His reasons: We are beginning to realize the importance of welding variables (current, voltage, heat input, metallurgy, etc.); quality is getting more important; the industry is getting increasingly competitive.

HOW CRYSTALS GROW—Researchers at the Bureau of Standards, Washington, have completed a study on the growth of zinc whiskers that permits evaluation of two theories on crystal formation. One postulates the formation of two dimensional nucleuses on a completed surface layer; this involves high, local, vapor supersaturation levels. The other, the screw dislocation theory, depends on a local dislocation to form a monatomic "step"; growth is continuous and screw shaped, and a lower supersaturation of the vapor is required. Growth, measured in a vacuum system at low supersaturation levels, confirms the screw dislocation theory for zinc. Other metals are being studied; results will aid in understanding crystal growth of metals.

SEVEN LEAGUE POWER BOOTS—Investigators have about decided that it's feasible to move up to 25 billion kilowatt hours of electricity a year over distances up to 1000 miles with superhigh (460,000 to 690,000) voltages). A study of the factors involved has been completed by Westinghouse Electric Corp., Pittsburgh, and Pacific Power & Light Co., Portland, Oreg.

CONDUCT RADIATION TESTS—Wearing of plated parts like engine valves can be measured and compared with a radiation tester developed by Eaton Mfg. Co.'s Detroit laboratory. The equipment projects its readings in a correlated, direct numerical value.

STRONGER MOLYBDENUM—Precipitation hardening procedures can enhance the high temperature tensile strength and the creep rupture strength of Mo-TZC alloy (molybdenum with 1 per cent titanium, 0.1 per cent zirconium, 0.14 per cent carbon). Properties may even exceed those obtained by working, when the tests are run at elevated temperatures. The dispersed phase is thought to be primarily carbides of molybdenum and titanium.

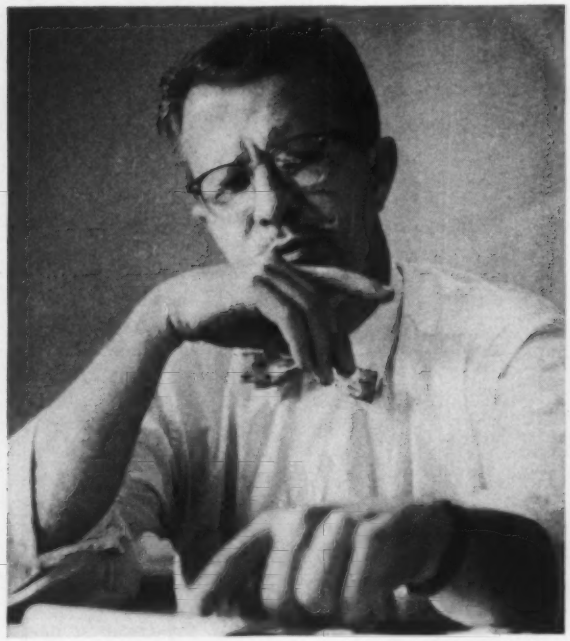
BUTTWELD TRICK—An unconventional aluminum buttwelding technique at the Puget Sound Naval Shipyard does in two passes what used to take four to six. Production has more than doubled. Automatic, inert gas, shielded metal arc equipment is used with high currents. A square butt joint is used instead of a single-Vee. The gas is a mixture of 80 cu ft of helium and 10 cu ft of argon an hour. Using 375 amperes of current at 32 volts, the 3/32 in. diameter electrode produces the approved welds at 20 in. a minute. The passes (one from each side) overlap about 3/16 in. The new technique is reported to use less than half the former amount of inert gas and electrode wire.

Tips for Better Electroplating

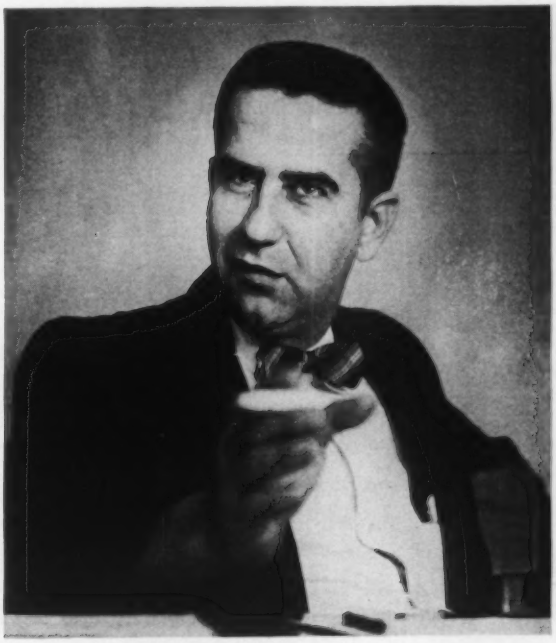
DR. C. L. FAUST: Look at electroplates as materials and provide specifications for the properties needed to do a job

WILLIAM H. SAFRANEK: The onus of becoming product oriented lies as heavily on purchasers of plated coatings as it does on the supplier

● "ONE OF OUR metallurgists asked us to put a nickel plate on a part. We asked what properties he wanted or how he intended to use it (to give him the right kind of plate). We were informed that the metallurgist had decided nickel was the metal to have on the surface, and it was none of our business what he wanted to use it for. This left us without any opportunity whatever to decide how to give him what he wanted because he didn't tell us what he wanted," says Battelle's Dr. Faust.



JOHN G. BEACH: A close plater-purchaser plan of operation can end many common errors and greatly improve quality



GLENN R. SCHAER: Too often the plater is not cognizant that preparations for plating are really the cheapest part of the operation

• **TOO OFTEN** a plater cannot contribute to product design because the customer doesn't or won't give him enough information about the application. STEEL asked a panel of experts at Battelle Memorial Institute, Columbus, Ohio, to pinpoint such shortcomings and to offer remedial suggestions.

Here is what they say:

• **A big increase in quality and reduced costs are advantages of a close, plater-purchaser relationship.**

They can consider the metallurgical aspects of a job, says J. G. Beach. For example: Common mistakes, such as specifying decorative type castings for high temperature conditions, can be eliminated, and other things, such as bond strength, corrosion resistance, and surface brightness, can be improved.

• **Specify environment, properties, strength, corrosion resistance, finish brightness—just as if you were buying a piece of metal.**

Look at electroplates as materials, and provide specifications for the properties needed to do a job, says Dr. C. L. Faust. If those are done, the way parts are processed is unimportant. He also thinks: Perhaps electroplaters must become more product oriented or more materials oriented and less process oriented. Much electroplating today is oriented processing . . . then testing to see if the process has given the required quality.

W. H. Safranek adds: The onus of becoming product oriented lies as heavily on purchasers of plated materials as it does on the supplier of electroplated coatings.

The first step in any product, says Dr. Faust, is to design it and to choose the materials. He recommends: Consider electroplating at this stage because the quality of the material, its surface condition, and its shape are factors that will influence the quality of the coating.

A plate can be perfectly sound as far as electrodeposition is concerned, but it can be unusable due to an improper base. Be wary of surface imperfections; they project right into the finished coating. The base affects adherence, porosity, and other aspects of quality.

Too often, a plater accepts material that should be refused. A plater cannot be expected to take any kind of surface that happens along and expect to make a high quality product out of it, says Dr. Faust. The day is coming when the plater will have specifications on what he will accept and what he will not accept.

• **There is a considerable amount of information on the properties of commonly used platings (nickel, copper, chromium) as related to electrodepositing conditions.**

Over the last several years, the life expectancy of automotive plating has improved 200 to 400 per cent, says Dr. Faust. As a result of research into auto chrome work, it's known that certain properties can be obtained and identified as being important for high quality protection and retention of appearance. The knowledge will also be helpful for aerospace applications.

Platers recently learned how to evaluate ductility in a coating (important for shock loads). Ductility must be evaluated in connection with the several layers of plating in many cases and related to substrate hardness.

Corrosion resistance of the plate metal is not enough. In decorative

Check Points For Plating Jobs

PAY particular attention to:

1. **Properties of the basis metal.**
2. **Surface properties of the basis metal (independent of the rest of the metal).**
3. **Properties of the diffusion alloy of the basis metal and the deposited metal alloy (if it's a high temperature use).**
4. **Properties of the deposited coating.**

To illustrate the points, Battelle's experts used this dramatization.

Dr. Faust: The part is a beryllium sphere about 12 in. in diameter. An electroplate is required to prevent oxidation at about 1100° F. The part is abrasive finished to about 10 microinches rms.

Mr. Beach: What about surface cracks?

Dr. Faust: If the part is cracked, we're wasting money in plating it. The history of the beryllium part is as important as the quality of the electroplate in getting a good product.

Mr. Beach: You can do the job with chromium over a thin copper plate and a thin zinc-copper plate. The intermediate coatings act as bonding materials and prevent the chromium from alloying with the basis metal.

Mr. Safranek: One way to get around chromium brittleness and its tendency to crack is to consider laminations of chromium with some other metal—nickel is a good one. When you heat the lamination (as under service conditions) you diffuse the metals, and the alloy that's formed is better than either metal.

Dr. Faust: Should thermal stability of the electroplates be considered?

Mr. Safranek: A high temperature and low contraction chromium should help provide freedom from cracking. Select a nickel sulfamate solution for maximum dimension stability and minimum change in density and structure.

Mr. Beach: Before releasing the parts, consider a quality control heat treatment to check the bond of the plate.

plating, the plate may not have to withstand severe corrosion, but where the plate is being applied primarily for corrosion protection, the way it is applied, as well as the corrosion resistance of the plate must be known.

Some methods of decorative plating leave tiny cracks or microporosity—no problem for indoor exposure, but under severe conditions, the basis metal may be corroded while the metal of the plate is untouched. Cracking or flaking results. The same metal plated by another process, or with a change in substrate, may give top performance.

All problems can't be solved by increasing the thickness of the plate.

Automakers are still concentrating on troublesome points and are improving the correlation between accelerated corrosion tests and outdoor weathering — especially the ravages of service, comments Mr. Safranek. Another area of special benefits for platers and purchasers will be more information about properties and the property-to-performance relationship.

• High quality and high production are not always compatible.

An electroplater faces the problems of cleaning the surface, questions of plate thickness, and selection of a plating bath. A hurried production schedule sometimes means that contaminated cleaners are not changed. Result: Poor adhesion. If plating solutions are not purified, quality suffers.

Too often, the plater is not cognizant that preparations for plating are really the cheapest part of the operation, says G. R. Schaer. Proper maintenance or preventive maintenance is a necessity.

• Quality control checks and instrumentation can improve quality.

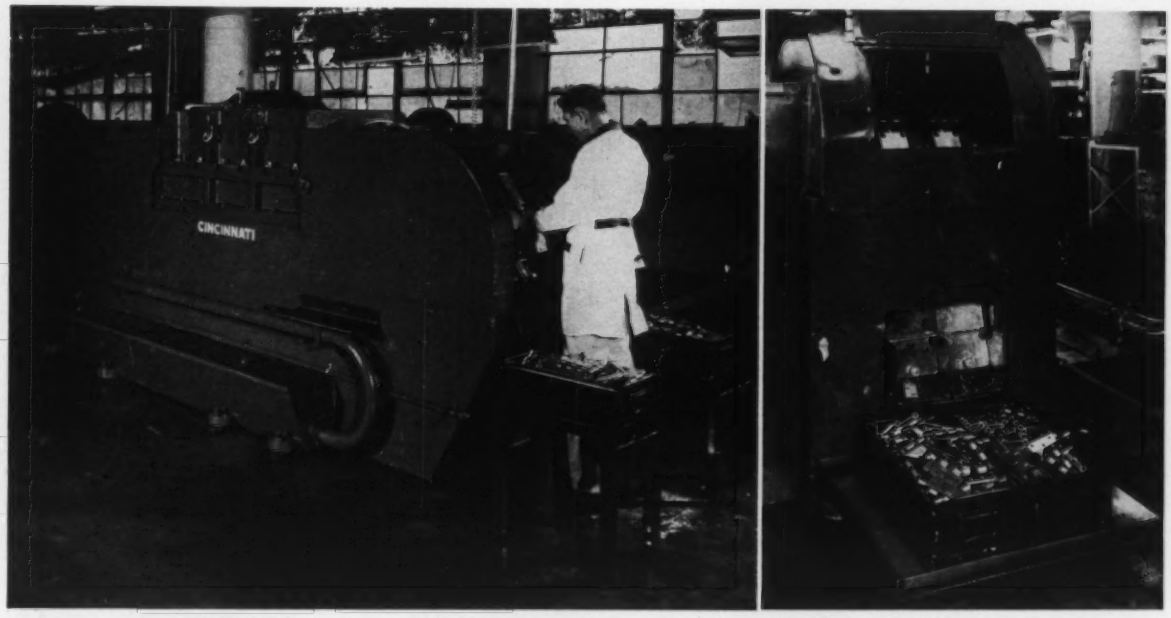
Since plating involves 10, 15, or 20 operations from cleaning to the final coating, each step involves a problem of chemically maintaining proper compositions of solutions and knowing when solutions are in or out of balance.

• Check out processes and material properties.

Chrome plate, for example, can be produced to attain different properties, and so can nickel and other coatings. Some, but not all, nickel plates are suitable for high temperature service, adds Mr. Beach.

Electroplate for high temperature conditions should be thick enough to take care of alloying, corrosion, and erosion. Mr. Schaer reports one instance where wire was nickel plated. Under heat, the coating failed. Reason: A metallurgical cross section showed the nickel had been completely consumed by oxidation. A better job would have required a thicker coating or a different material.

When designing a plate for high temperature conditions, consider the alloying action of the coating and the basis metal and the characteristics of the alloys. Sometimes they're beneficial and sometimes detrimental, cautions Mr. Beach.



Leaves are fed into entry end of chain unit, emerge two at a time . . .

Nonstop Broach Speeds Hinge Production

• THE ACCENT on automation boosts the potential of chain broaching, a method that has been around a long time without going too far, says Cincinnati Milling Machine Co., Cincinnati.

A case in point: Lawrence Bros. Inc., Sterling, Ill., is chain broaching high quality leaves for door hinges. The company used to mill the slots—a method that was versatile, accurate, but too slow. Clamping parts and machining them in the milling machine accounted for most of the lost time.

And slow production hurt. There's not much room for profit between the cost of material and the end price of a door hinge.

• Chain broaching steps up the production of hinge leaves.

At Lawrence Bros., a Cincinnati chain broach is mass producing several sizes of hinges on a continuous cycle. Parts, mounted in fixtures, are fed across tool inserts by the chain. Guideways hold the fixtures in close alignment, so tolerances are easily held.

As the fixtures approach the broaching inserts, they are aligned and supported by bearing strips on each side of the broaching tunnel. A safety interlock stops the machine cycle if a part is incorrectly loaded in the fixtures.

To minimize changeover time, the fixtures are designed so the operator can quickly substitute the locating details in each of the six fixtures. Up to six additional fixtures can be added to the chain, and any fixture can be removed without disconnecting the chain, and the remaining fixtures can continue in service.

• The production rate is fast. On some of the smaller hinges, the broach slots a leaf every 2 seconds. One popular size is turned out at a rate of 924 parts an hour.

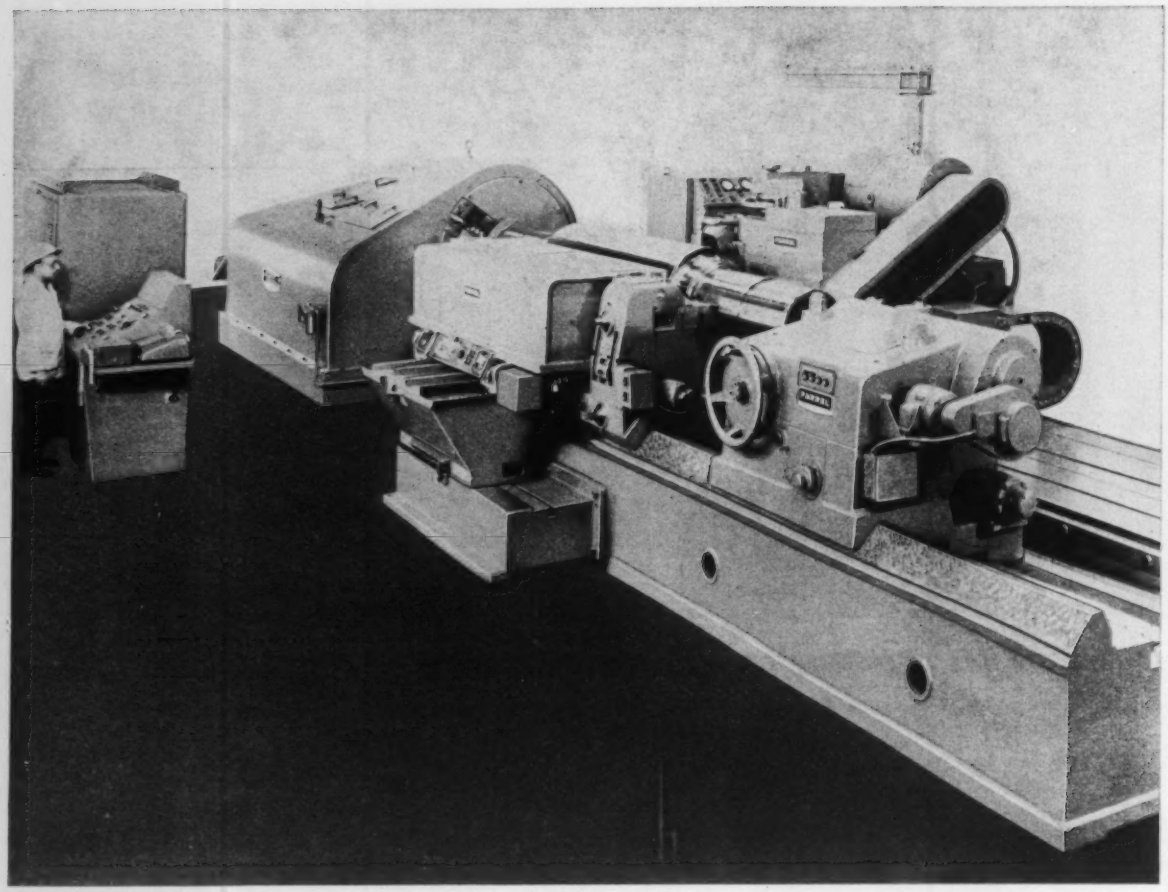
Fixture clamping, broaching, unclamping and unloading are all automatic, contributing to the relatively high production rates. Loading is done by hand, but Cincinnati Milling engineers say it too could be automated.

Chip disposal is also automatic. A pressurized coolant system washes the chips away from the cutting area into a trough at the side of the machine. An endless conveyor at the bottom of the trough carries the chips to a disposal point away from the machine.

• Tool sizes are adjustable; one set of roughing and finishing tools is adaptable to all hinge sizes.

Lawrence Bros. uses two identical sets of tools—one is sharpened while the other is at work. The setup keeps downtime for tool change at a minimum.

The company is getting complete interchangeability of machined parts at higher production rates. And most important, costs have been trimmed to protect the company's ability to make a profit in a highly competitive business.



From a remote console, operator keeps watch as . . .

Punched Tape Guides a Roll Grinder

• PUNCHED TAPE soon will take over the precision refinishing of steel mill rolls at Great Lakes Steel Corp., Detroit, a subsidiary of National Steel Corp. It's one of the first successful production applications of numerical control to grinding.

The 60 in., heavy duty roll grinder (made by Farrel-Birmingham Co. Inc., Ansonia, Conn.) will automatically grind straight or crowned rolls up to 5 ft in diameter and will duplicate diameters for pairs of work or backup rolls.

Two important advantages: 1. Numerical control will give extreme repeatable accuracies, permitting mill management to fix and maintain standards for regrind procedures. 2. Rolls should last longer since the stock removed at each regrind is automatically held to a minimum.

• The machine automatically rough grinds, aligns the workpiece, semi-finish grinds, dresses the wheel, finish grinds, and measures and records the roll size. It's the first of three machines for Great Lakes.

The control, made by General Electric Co.'s Specialty Control Dept., Waynesboro, Va., initiates 17 machine and control operation sequences as primary functions. It orders four other sequences as secondary functions. It directs two servocontrolled motions, two variable speed motions, a fixed speed motion, and associated devices. It picks any of ten speeds for the machine headstock, carriage, grinding wheel, step infeeds, and continuous infeed rates. It selects any of six combinations of diamond positioning and crossfeed for wheel dressing.

• Size and contour are guided by probes.

Three probes are carried on a table on the front side of the machine. Explains Dr. Peter Hold, manager-research and development at Farrel-Birmingham: "The probes not only terminate or control the various phases of the grinding cycle but also perform other functions, like roll alignment and inspection. A probe on the grinding wheel constantly keeps track of the size of the wheel. This intelligence is needed to maintain the dressing diamond in line with the periphery of the wheel and to enable the wheel to approach the work without running into it."

The front probes, set by servo-controls, measure the diameter and profile of the rolls being worked and detect work remaining to be done. Since the center positions of mill rolls normally show greatest wear, the probe table finds the minimum diameter there. To reduce the higher end surfaces of the roll to this diameter, the control first orders a special sequence known as short stroking.

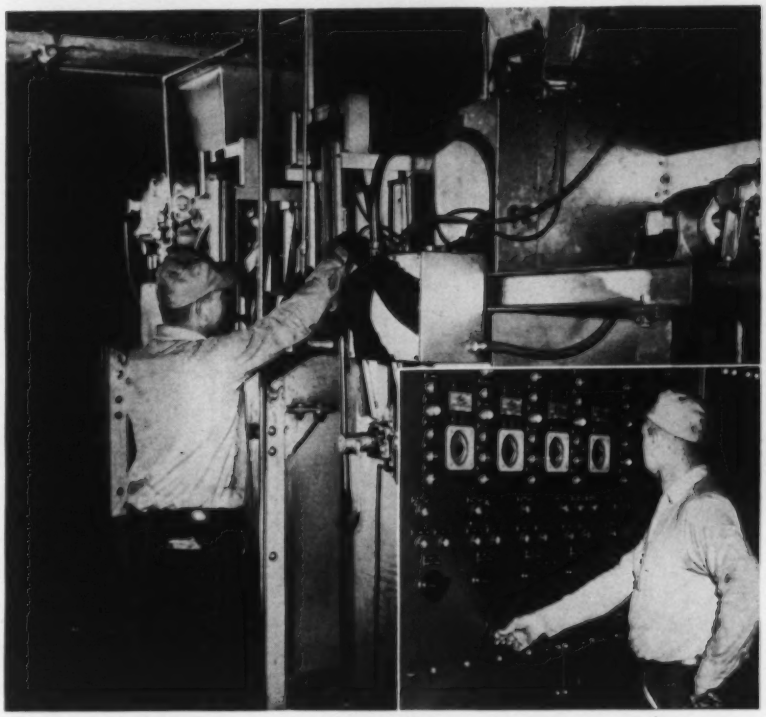
In the short stroking phase, the wheel moves toward the work until the control senses that it has picked up a slight load. That is sensed by detecting variation in amperage of the grinding wheel motor. Then the wheel is traversed to the near end of the roll, steps in as programed, automatically retraces its course until it loses load, and steps in again. That is repeated until automatic checks sense that the end of the roll is within the programed number of thousandths of minimum roll diameter. The wheel then retracts and moves to the other end of the roll to repeat short stroking.

After short stroking of the ends, the roughing cycle is completed by a programed sequence that passes the wheel back and forth across the face until the entire roll is within the preselected tolerance.

The grinding wheel then is diamond dressed (if programed), and finish grinding is made to final tolerance with individual speed changes programed for headstock, wheel, and carriage drives to produce the desired finish.

Special features of the control will match the diameters of both work rolls in a mill stand pair, and will automatically compensate for differences in original diameter and uneven wear.

Weigh hopper at smelting plant is . . .



Controlled from master panel on production floor

Abrasive Dust No Problem For High Accuracy Scales

• IN OPERATION since 1958 without breakdown or downtime . . . is the report on batch weighing equipment at Alcoa's smelting plant in Newburgh, Ind. Accuracy of ±0.1 per cent is expected to be maintained throughout its useful life.

The automatic equipment operates in a building where dry aggregates for carbon anodes are mixed. Abrasive, sootlike fines continually coat all exposed surfaces.

The aggregates are delivered in bulk to rooftop bins directly over a bank of four automatic scales, which are equipped with remote readout and control stations.

• The scales use levers suspended from flexure plates to eliminate wear from the abrasive particles.

The manufacturer (Thayer Scale Corp., Pembroke, Mass.) says the entire weighing system has no wearing parts. Readout systems for the setup include punched tape, printed material, and digital totalizers—the batch process units also have variable control.

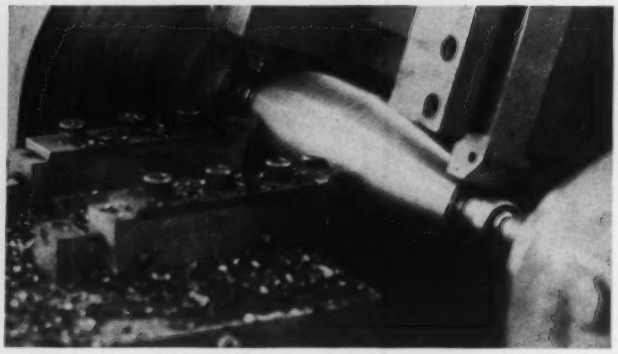
• Each scale handles a different aggregate size that must be precisely proportioned for each formula.

The over-all cycling speed of the system can be varied from the remote control station. The scales are not identical—in a 4 minute batching cycle, capacity is 560 to 1400 lb for the smallest, 2500 to 3500 lb for the largest.

Another Thayer scale is used as an integral part of the conveyor to check the weights of the finished silvery gray anodes. The unit rejects anodes of wrong weight and keeps the cumulative weight of accepted units.

Molded sand cores are one secret of concentric mortar shell bodies . . .

With good ID surface finish . . .



Exterior surface of casting machines easily, quickly

Cast Pearlitic Malleable Gets an Ordnance Break

• A PROCESS has been developed for producing 81 mm mortar and artillery shell bodies from cast, pearlitic malleable iron. It's expected to open a large market for malleable. (Shipment in 1960: 190,000 tons—mostly to automakers.)

Substantial manufacturing economies and superior fragmentation are advantages claimed in the use of the material (a noncritical defense item), say Albion Malleable Iron Co., Albion, Mich., and the U. S. Army Ordnance Special Weapons Ammunition Command, Dover, N. J., codevelopers.

The company has a $935,000 contract to produce 173,000 rounds of 81 mm mortar shell bodies.

• Precision casting, an accurately controlled annealing cycle, and special ultrasonic testing techniques help make the process possible.

Use of the shell core process helped provide part concentricity and uniform wall thickness—important since proper trajectory of a fired shell depends almost entirely on balance and weight distribution. Specifications require an accuracy within thousandths of an inch.

Yield strengths can be accurately controlled from 50,000 to 100,000 psi by varying the annealing process. Formed during annealing is soft ferrite, which contributes toughness and ductility, plus pearlite with its high tensile strength (almost equivalent to annealed steel). The temper carbon (simultaneously dispersed throughout the structure) acts as a solid lubricant to the cutting tool and makes possible high cutting speeds, prolonged tool life, and good machined surface finishes. Close metallurgical control helps assure a strong, easily machinable casting with desired fragmentation upon explosion.

Annealing takes 24 hours compared with more than a week previously. Improved melting control permits the use of a relatively high silicon and low carbon content in the metal to accelerate annealing. That innovation, plus the elimination of large amounts of packing materials and near automation of the annealing furnaces, accounts for the fast heat treating cycle.

To insure safety, a special designed ultrasonic inspection device made by Sperry Products Inc., Danbury, Conn., subsidiary of Howe Sound Co., checks all shell bodies for defects. It uses a lead titanate transducer to generate a mechanical wave (2½ million cps) for that purpose.

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"the highest quality money can buy"

On critical applications when only the best will do—specify CVM (Consumable Vacuum Melted) steels and alloys from Vanadium-Alloys Steel Company. Our CVM label is your assurance of unsurpassed quality and purity.

To begin, our steels are melted under stringent tool steel practice in order to insure electrodes of the highest quality and purity. Our versatile vacuum melting furnace, with closely regulated power input, enables us to melt 9½", 12", 16", 20", and 24" ingots at continuous vacuum pressures below one-half of a micron for maximum degassification.

A half-century of experience melting a wide variety of alloys has taught us how to realize the highest structural quality from each composition. Pleased customers regularly report higher physicals and better metallurgical structures with our melts as compared with the same grades produced in other furnaces.

Today, the aircraft and missile industries are enjoying the extra value of CVM steels with their higher strength and improved cleanliness, with subsequent critical weight savings and higher fatigue life. Why not see how CVM can answer your special steel problems? Our sales and metallurgical departments will be pleased to discuss your requirements.

CVM GRADES NOW AVAILABLE

*VascoJet 1000	*8620	304 Stainless
*4150 Modified	*9310	316 Stainless
*4330+V	*A-286	317 Stainless
*4335+V	Inco 901	410 Stainless
*4340	V-57	436 Stainless
*4350	*52100	M-1 High Speed Steel
300 M	*51100	*M-2 High Speed Steel
X-200	*440-C Stainless	*M-10 High Speed Steel
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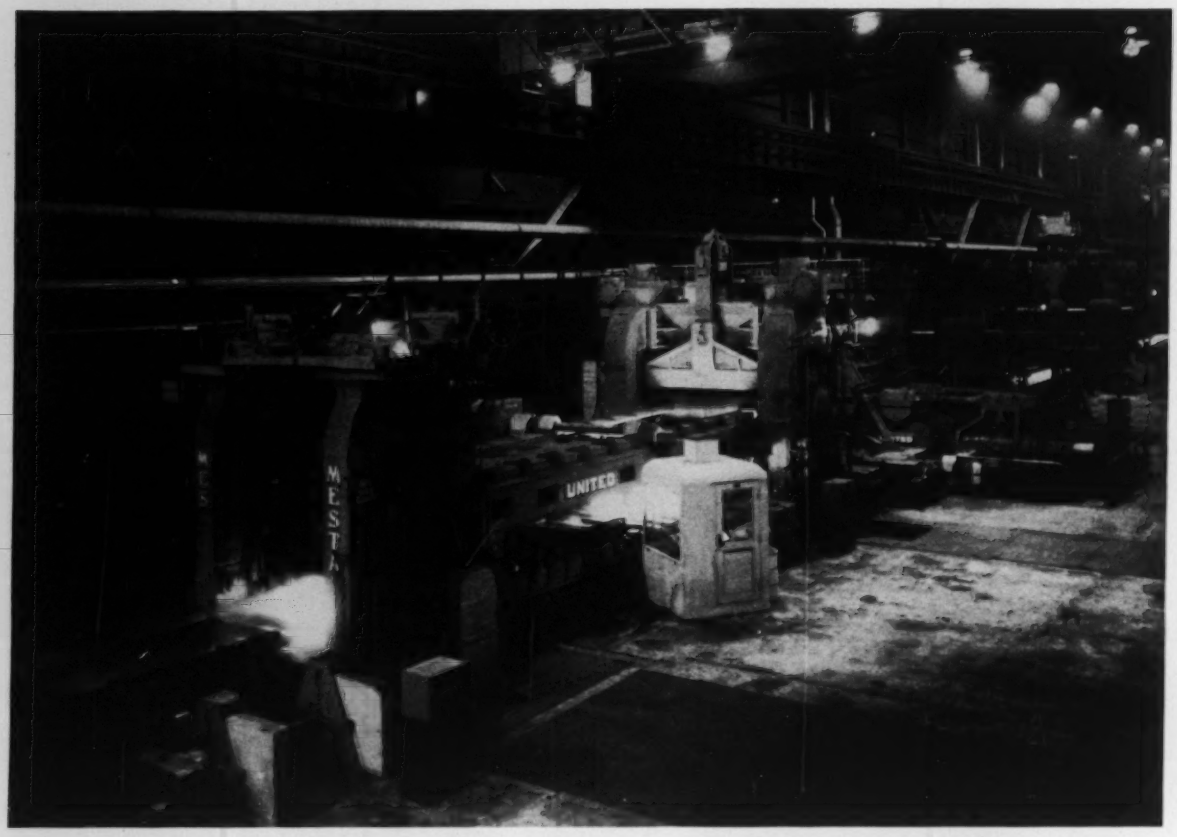

Scale breaker, broadside mill, and roughing stands take larger slabs . . .

Hot Strip Mill Revamped; Rolling Capacity Doubled

• MODERNIZATION of a hot strip mill at the Campbell (Ohio) Works of Youngstown Sheet & Tube Co. more than doubles rolling capacity of the mill, improves product quality, and gives the company better control of production costs. Cost of the project, which was started in late 1958, was more than $60 million, excluding expenditures for a new annealing facility.

The strip mill revamp included enlargement of slab handling equipment and blooming mills at the Campbell and Brier Hill (Youngstown) plants. Continuous pickling lines, conveyors, and coil handling equipment were also enlarged.

• Heavier slabs are handled at higher processing speeds, with larger heating and rolling equipment.

Three slab furnaces heat steel to rolling temperature (2400° F) in 90 minutes. Each furnace is 28 by 100 ft, to accommodate 26 ft slabs available from revamped bloomers. (The slabs weigh up to 20 tons vs. 7 tons for the 15 ft slabs previously available.)

Heated slabs pass through a vertical edger, a scale breaker, and a broadside rolling mill before going into the four roughing stands. Present blooming mill equipment limits strip width to 60 in. in straightaway rolling. But the broadside mill makes it possible to widen slabs before they enter the roughing stands and extends maximum strip width to 72 in. (trimmed).

• Better gage uniformity is maintained with electronic inspection and gage control devices.

Tendency of the strip to run off-gage at the tail end of the coil (because the slab cools and hardens as it passes through the mill) is minimized in the six stand finishing train, which was part of the original strip mill. Regulation of cooling water flow helps hold rolling temperature constant. "Tail pulling"—reduction of roll speed,

NEW— Handy Ferroalloy Selector

Here in one compact folder that opens for use as a desk or wall chart, is a complete summary of over 150 grades of ELECTROMET ferroalloys and metals. Each product's chemical analysis is given along with a brief description of its major uses in making better steel, iron, and nonferrous metals.

The folder also gives phone numbers and addresses of Union Carbide Metals' sales, service, and production facilities. Always on call, this nationwide network is just one of the *extra values* you get when you buy ELECTROMET ferroalloys and metals. In addition, you get the latest in ferroalloy technology from Union Carbide Metals' 600-man research and development center, plus help where needed from its metallurgical service engineers who travel more than a million miles a year to provide customer service.

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Please mail promptly my free copy of the "ELECTROMET Ferroalloys and Metals Selector"

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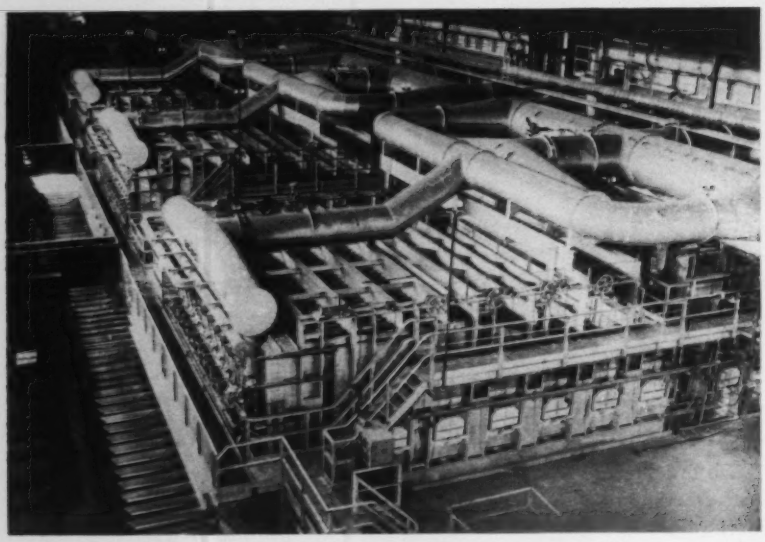
New building, furnaces offer more efficient annealing



Bigger slab heaters boost process tonnage

one stand at a time, as the strip passes through—stretches the back end of the coil and helps hold the strip on gage.

Later, an automatic gage control system will be provided for the mill by Westinghouse Electric Corp. X-ray gages and strain gage load cells will monitor strip thickness and roll pressures on three of the six finishing stands. The system will apply more power to roll motors, and adjust screwdowns to compensate for gage runup on the tail end of the coil.

• New facilities provide close control of the annealing process and expedite handling of cold strip coils.

Annealing equipment includes 42, single stack, 75 ton furnaces, four, 300 ton units that take four stacks at a time, and two, open coil furnaces (30 ton capacity), which are used in making single coat enameling steel.

Air Power Speeds Handling Of Open Hearth Materials

A PNEUMATIC system for faster handling of dolomite, lime, and iron ore in open hearth shops has been developed by Blaw-Knox Co., Pittsburgh. A prototype of the system, fabricated at the firm's Blawnox (Pa.) plant, employs storage bins that meter material to activators, or pressure vessels, at the upper furnace level. Each activator is designed to serve two furnaces.

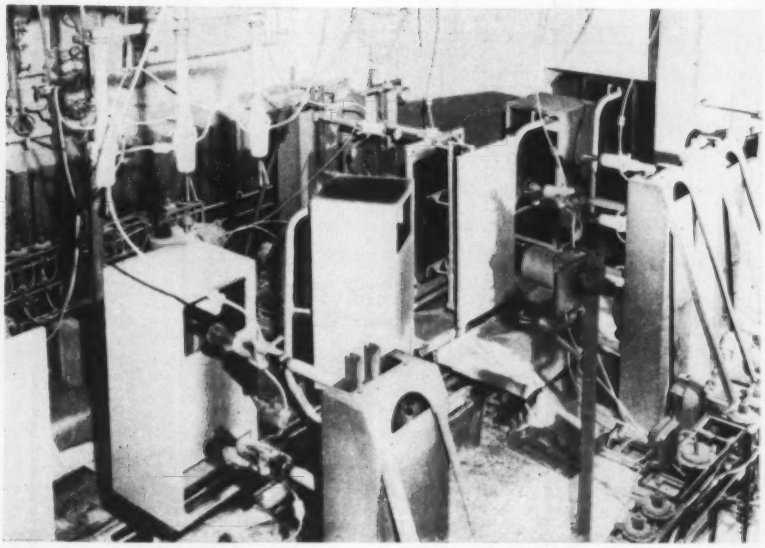
Gravity and low pressure blowers move material from storage bins at the lower furnace level, through pneumatic conveyor lines and into cyclone receivers on the charging floor. Ore and lime are pressure fed into the bath, through lances. Cyclone design of the receivers, which can vary in diameter and depth, causes dolomite to fall through a swivel spout to a patented throwing mechanism. Dust problems are said to be eliminated.

The throwing mechanism is said to apply dolomite with just enough force to secure it to the furnace wall —without spraying and breaking the refractory material. That counteracts erosion and maintains adequate wall thickness during the heat. Hoppers hold enough material for one furnace makeup. Indicators show when cyclone receiver stations must be refilled.

The system clears the charging floor of material and handling equipment. And it frees hot metal cranes for other duty. Air power moves the hopper and throwing mechanism along an overhead monorail at speeds up to 176 ft a minute. The unit is elevated after use, to provide adequate walking clearance.

Glass Used as Lubricant To Extrude Carbon Steel

GLASS will be used as an extrusion lubricant in the manufacture of carbon steel tubing. Lorraine-Escaut will employ the method at a plant in Anzin, France. Previously, the process was limited to alloy and stainless steel tubing and shapes. Lorraine-Escaut obtained a license from Cefilac, a subsidiary of Ugine, French electrometallurgical company.



More refrigerator doors, cabinets finished as . . .

Electrostatic Paint Setup Accommodates Mixed Sizes

• FOUR WAY positioning devices for bell atomizers and automatic paint triggering made possible the electrostatic painting of mixed sized refrigerator doors and cabinets on the same line.

As a result, American Motors Corp.'s Appliance Div. plant at Grand Rapids, Mich., reports improved finish, paint mileage, and lowered labor costs. Rejects, formerly a major problem, have been virtually eliminated.

Production requirements ruled out the use of the reciprocating disk technique for paint application. More flexibility was needed to accommodate mixed sizes of cabinets and doors on the line at the same time.

Ransburg Electro-Coating Corp., Indianapolis, suggested a moving bell setup with automatic controls for paint triggering and repositioning. Coating on the parts is maintained at a uniform 1.8 to 1.9 mils regardless of size variation.

• Sides of the cabinet shells and doors are painted at the first station equipped with four reciprocating units, two on each side of the line.

Each unit has three atomizing bells mounted in a vertical line, one above the other. The 4 in. bells, rotating at 900 rpm, move up and down and back and forth to maintain the proper painting distance (about 13 in.). The bells are controlled by limit switches. Paint is turned on and off by electric eyes.

• As the cabinets move toward the second station, they're indexed by a dolly system.

Doors are not indexed, but go straight through the line. At the second station, cabinet backs are painted by a three bell unit.

Three overhead stationary bells apply the first coating to cabinet tops. After a short flash off, other units apply another coat.

• Before entering the final station (identical to No. 1), cabinets are indexed to the original position for another coating on the sides.

Hand touchup finishes the job. The parts are baked at 305° F for 30 minutes.

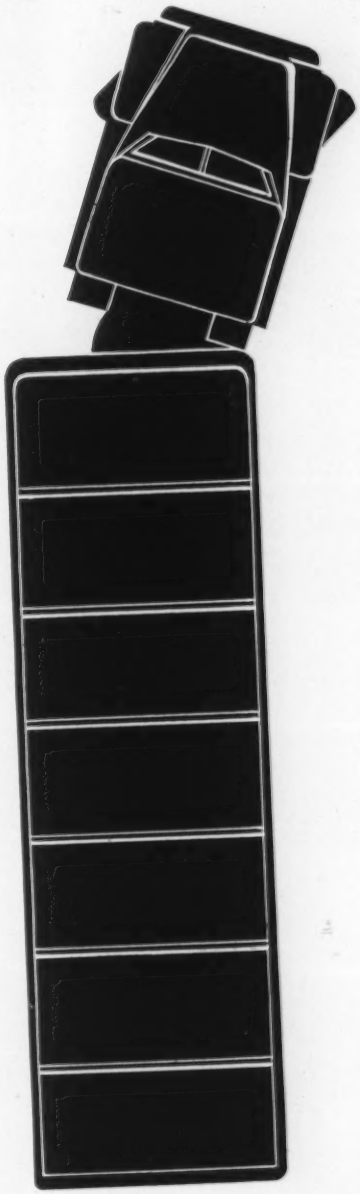
Look Ahead...

. . . for an example of Allegheny Stainless at work in a specific market application, featuring the fabricated products of Allegheny Ludlum customers.

Check the next two pages which also appear in the current issues of FLEET OWNER, COMMERCIAL CAR JOURNAL, AUTOMOTIVE NEWS, and TRANSPORT TOPICS.

It's just another case of how Allegheny Stainless can work for you . . . in your products . . . in your markets . . . in your merchandising efforts.

3300



Fruehauf's Stainless Steel Trailer is ahead by a country mile

New price reductions promise even more stainless units on the roads

Advanced engineering and manufacturing techniques in the production of the premium semi-trailer on the highway today . . . Fruehauf Stainless Steel Vans . . . have made possible reduced prices on the line. This news is being welcomed by fleet owners and operators everywhere.

Fleet operators have replaced trailers made of other than stainless steel several times over while their stainless units have kept delivering payload with virtually no exterior maintenance. These operators have records full of evidence of the value of stainless trailers and their acceptance of the new price announcement is most enthusiastic.

Perhaps even more interested should be the people who have heard of the better values in stainless trailers but who have

..OR GOING

been stopped by the high premium charged for the best.

Fruehauf's new prices now bring stainless trailers within a few percent of the cost of trailers built of other materials. The stainless unit provides even greater hauling profits, combining increased strength and capacity with added years of almost maintenance-free durability.

The new lower prices just announced by Fruehauf were a result of their continual, extensive cost reduction program. Allegheny Ludlum, as the major stainless steel supplier, worked right along with the Fruehauf engineers and production men on this program.

A-L research and application engineers are at your service, too, for counsel on fabrication techniques and the economical use of Allegheny Stainless in your product. *Allegheny Ludlum Steel Corporation, Dept. MID 2, Oliver Building, Pittsburgh 22, Pennsylvania.*

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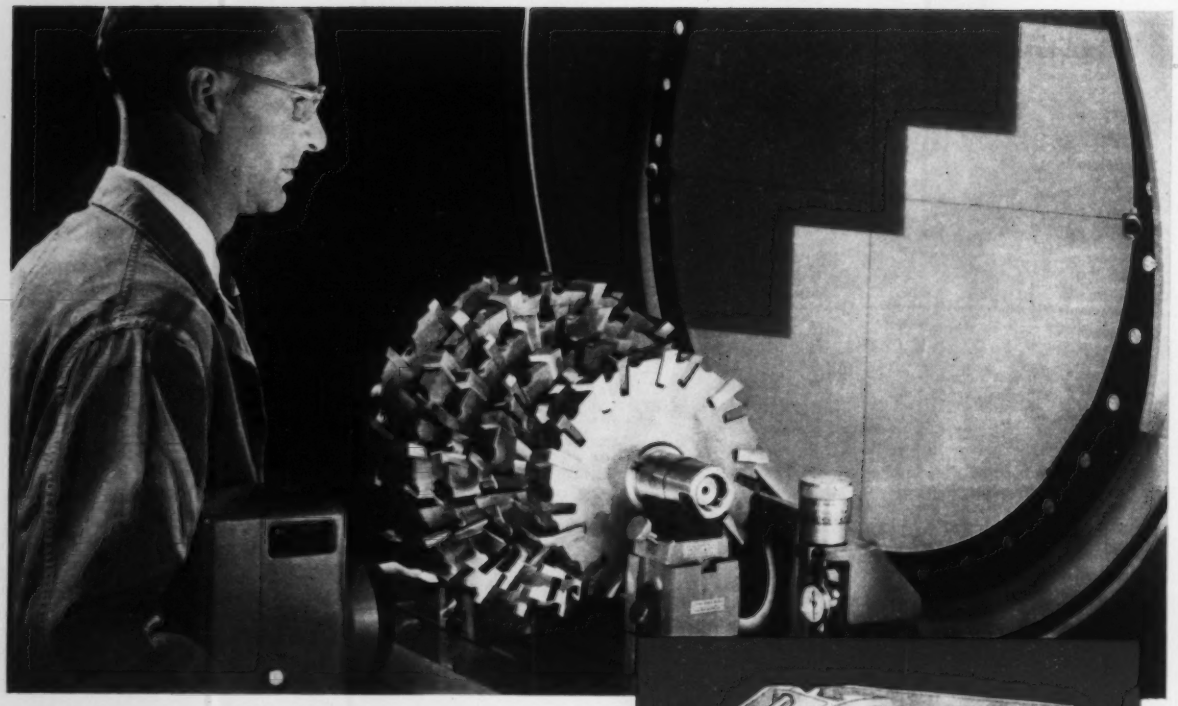
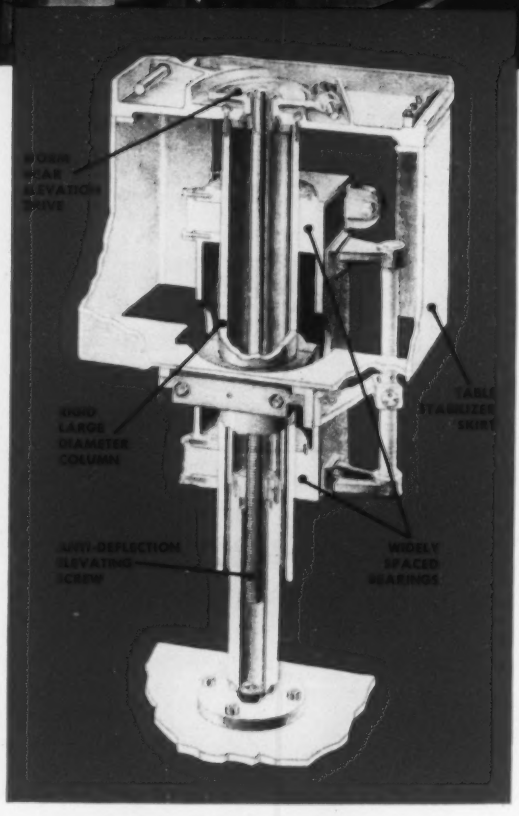
ALLEGHENY LUDLUM





Built by EX-CELL-O

To Insure Accuracy

Rugged, precision construction of Ex-Cell-O Contour Projectors results in stable support for the optical systems providing accuracy in the order of .0001". This rigidity is a major consideration in achieving for Ex-Cell-O Projectors an outstanding record of trouble free operation and almost total elimination of down time.

Typical of the sturdy, precision workmanship to be found throughout Ex-Cell-O Contour Projectors is the worktable of the Model 14-5 and Model 30. Engineers will recognize the superior design features shown in the inset at right. To cite just a few, the large 5" O.D. columns, supported in widely spaced bearings; the heavy channel skirt to stabilize the table assembly and the flexible elevating screw which can't impart deflections to the column.

Because of these construction features Ex-Cell-O Contour Projectors support heavy loads firmly, yet move easily and smoothly.

Whether your problem involves receiving, production or final inspection there's an Ex-Cell-O Contour Projector to do the job accurately, quickly and at low cost. The "why" and "how" is condensed in our new booklet—"43 Reasons Why Ex-Cell-O Contour Projectors are the First Choice of Industry." Yours for the asking!

Manufactured by EX-CELL-O Corporation at Detroit, Mich.

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Subsidiary of EX-CELL-O Corporation

New Carbide Put on Market

• Union Steam Pump Co., Battle Creek, Mich., is using titanium carbide tool bits for milling 300 and 400 Series stainless steels at 1900 surface feet per minute. Metal is removed at 30 cu in. a minute.

• An operation on 1118 steel at Saginaw Steering Gear Div., General Motors Corp., runs at 1100 sfpm with 0.0025 in. feed. Titanium carbide cutters are averaging 550 pieces per grind. With the former setup, conventional carbides averaged 340 parts per grind.

• On the finish boring of an SAE 5135 steel gear blank at 300 sfpm, conventional carbides produced an average of 60 pieces; titanium carbide turned out as many as 750 pieces per grind. The job's at Dana Industries, Toledo, Ohio.

• THE TITANIUM CARBIDE that showed its mettle on those jobs is the one that Ford Motor Co. announced two years ago. (STEEL, Mar. 16, 1959, p. 62.) Now, Vascoloy-Ramet Corp., Waukegan, Ill., has been granted the first license to manufacture and market the material (VR-65).

Field proved applications include: Machining automotive brake drums and transmission parts, missile bodies, steel mill rolls, large implement gear blanks and flywheels, and a variety of shafts.

Vascoloy-Ramet reports that the material works on most steels, including stainless, and cast iron.

• Higher speeds have produced better surface finishes.

Because the material will stand up under temperatures generated by higher cutting speeds, some jobs have shown a benefit in improved finish. For example, a 316 stainless steel part has been run at 0.0006 in. feed, 0.003 in. depth of cut, and 760 sfpm, with a resultant surface finish of only 3 to 5 microinches rms.

Vascoloy-Ramet also claims that superior edge wear and crater resistance of VR-65 can be credited with better size control on some parts. Example: 350 SAE 8615 steel gear blanks are machined to prescribed tolerances without any adjustment of the titanium carbide cutter. With conventional carbide, the operator had to adjust the cutter every 25 pieces to maintain accuracy.

• Both inserts and brazed blanks will be marketed.

The company will make both negative and positive rake mechanically held inserts, plus blanks for brazing to steel shanks and single point tools.

Tool geometry can be the same as that used on conventional carbide tools, but when the tools are applied to severely rough or interrupted cuts, strengthening of the cutting edge by negative rake angles is said to be beneficial.

The material can be ground on diamond wheels with the same practices used for harder tungsten carbide grades.

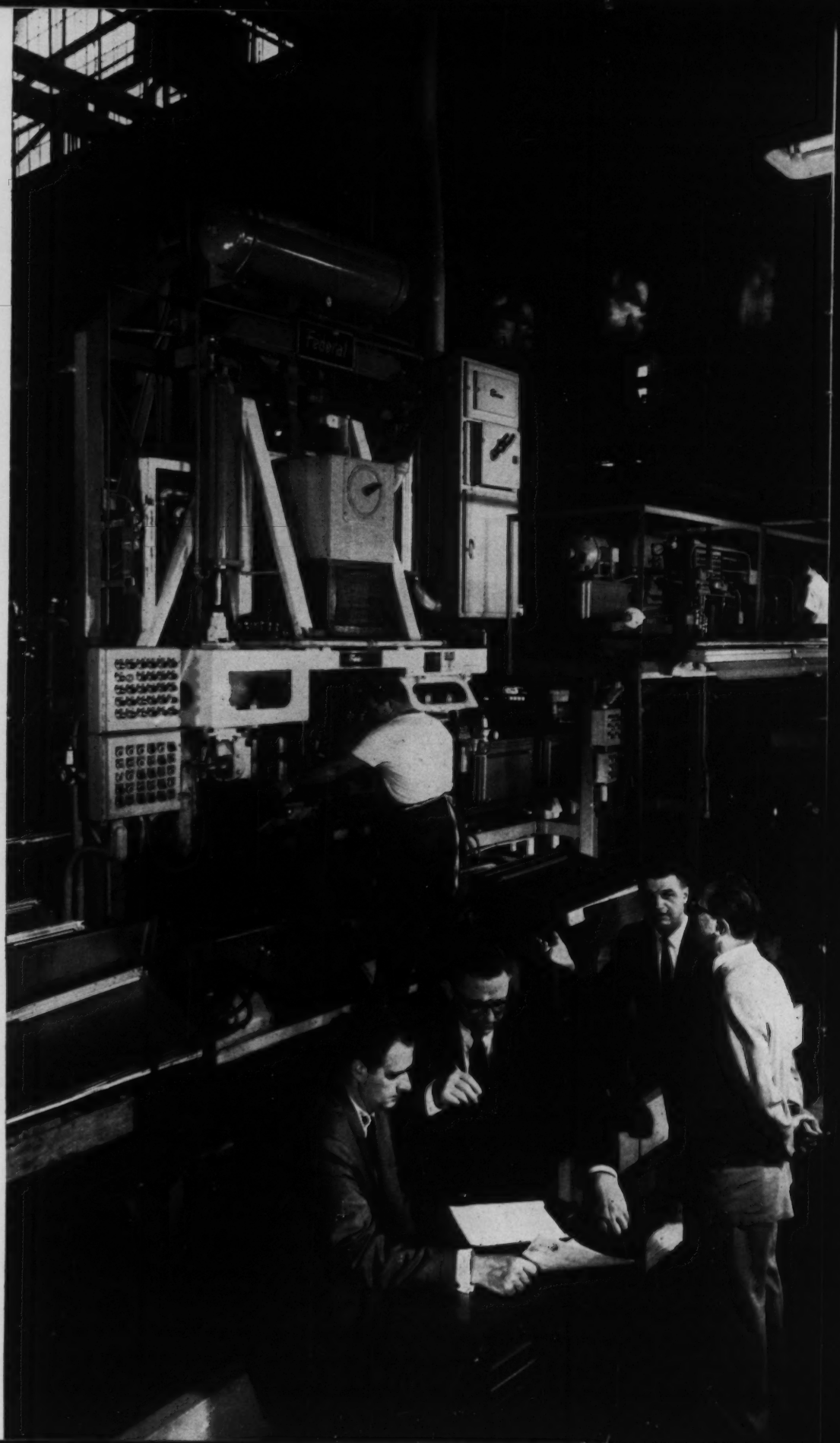
The company says it has machined parts with interrupted cuts, and the material has been used for milling — usually with good tool life, good metal removal rates, and good surface finish.

Space Vehicle Designs Shown by Ford

MULTIUNIT space vehicles are being designed by the Aeronutronic Div., Newport Beach, Calif., Ford Motor Co., to accomplish a wide variety of tasks.

A typical space train, says Ford, might have a command post up front capable of returning astronauts to earth. A propulsion unit at the center would permit orbital corrections and retro-thrusts for earth landings. At the rear, a detachable living or laboratory "car" would permit some maneuvering in space.

Three structural types are being investigated: Pressure stabilized membranes, rigid panel inflatable structures (shingles), and telescoping units.

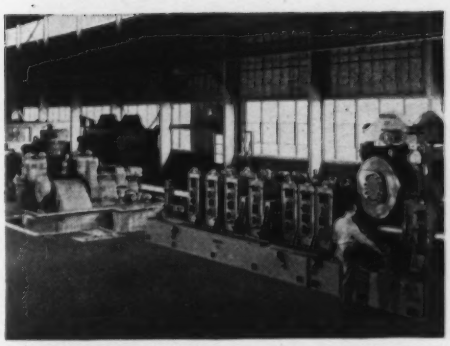


Federal Welding Line at Whirlpool's Evansville, Indiana, refrigerator plant automatically forms and welds together complete food liner shells at a rate of 200 per hour. Here, F. A. Bodenheim, Jr., manager of welder sales for McKay's Federal-Warco Division, goes over latest production charts with H. J. Muehlbauer, director of manufacturing engineering for Whirlpool, as Robert Bussell, sales representative for Federal-Warco, discusses operations with Gene Rommel, general superintendent of tooling for Whirlpool.

Photo by ARNOLD NEWMAN

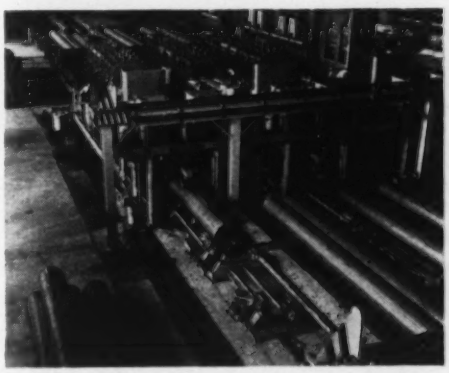
A completely integrated plant . . . a single source of supply . . . one area of responsibility! A new idea? Not really, but an idea that's not easy to bring to reality. McKay Machine has done it for metal fabricators, designing and building equipment to volume produce parts or entire units from raw steel to finished product. ***This is McKay Machine*** We know steel handling . . . we've been designing uncoilers and coil-handling equipment for 30 years. McKay Machine knows welding because the highly respected names of Federal Welder and Berkeley-Davis are now a part of our company. We know processing and forming . . . McKay levelers, tube mills, and cold roll forming machines have been specified by leading industrial firms for more than two decades. And McKay Machine knows stamping, as the Warco Press name testifies. McKay builds the industry's most popular shearing and slitting equipment. Only McKay Machine designs and builds all the components for a truly integrated production line. If you are one of the hundreds of manufacturers who must shave production and handling costs to successfully compete, McKay Machine should interest you. If we do, let us know and we'll meet with you at your convenience. *The McKay Machine Company, Youngstown 1, Ohio.*

McKAY MACHINE



McKay Tube Mills and roll forming machines are considered among the best engineered in the world.

Warco Presses can be found in the leading automotive, appliance and aircraft plants . . . wherever stamping is a major operation.



Berkeley-Davis Fusion Welding Lines, such as the huge installation above, are used by an ever-increasing number of leading steel fabricators.

On these large crankshafts, forging firm reports . . .

Induction Unit Cuts Heating Time

• HEATING of crankshaft ends takes only about one-quarter of the time consumed previously since installation of 60 cycle, induction heating equipment at the Park Drop Forge Co., Cleveland. Other advantages include closer control, and reduced scale which eases cleaning problems and cuts die wear.

The six station line has a power rating of 1000 kw, operates from a 440 volt, 3 phase line. It was built by Tocco Div., Ohio Crankshaft Co., Cleveland.

Park Drop Forge turns out the crankshafts for locomotive or marine diesel engines. They are produced from carbon or alloy steel as specified by the customer, and in differing sizes. The 60 cycle equipment helps in getting through heating in larger sizes and a wider range.

No coil change is needed for diameters from 8 to 12 in.

• Each station will heat a 12 in. diameter shaft end to upsetting temperature in 22 minutes.

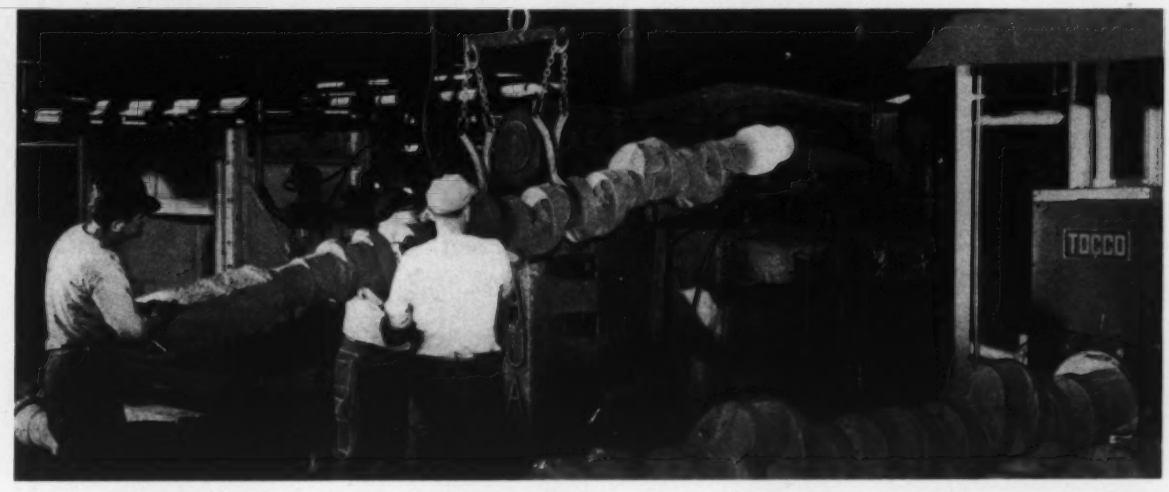
Previous equipment had been slot type, oil fired furnaces. In those units, heating time had been about 1½ hours; some jobs took as much as 2 hours. The large shafts are heated to 2200° F for a distance of 14 in. before being upset to form end flanges. Crankshafts processed by Park Drop Forge may weigh as much as 4000 lb; largest handled through the Tocco unit so far have been 3600 lb.

With an over-all heating cycle of 22 minutes for each station, the line will ready a crankshaft for the upsetter every 3½ minutes. The 22 minute cycle, compared with 1½ hours formerly, means a saving of 76 per cent in heating time.

• Induction heating permits close control of temperature.

An optical sensing head is mounted at each station. It sights on the work through the side wall, so is

Using six heating stations, totaling 1000 kw . . .



. . . one crankshaft can be transferred to upsetter every 3-1/2 minutes

out of the way and not likely to be damaged. The signal goes to a recorder controller which provides a written record of each shaft; an observer checks the operation on a regular basis to back up the automatic control system.

Coils at each station are 26 in. long, 15 in. in internal diameter. The 82 turn coils are shielded by ceramic insulation.

Heating through the section is uniform, Park reports. And the automatic operation of the heating units, with individual control of each shaft, permits improved metallurgical control as well as increased production.

• Scale formation is reduced, and startup time is shortened.

Continued holding at high temperatures increases scale formation. So the short heating time of the induction units has reduced scaling. In turn, the reduced scale has cut wear on the upsetting dies, which are costly to replace, and made cleaning up for subsequent machining easier. The light scale formed, Park observes, is flaky and easier to remove; it's particularly noticeable in sections with re-entrant angles.

Rapid heating is important too in the event of a temporary delay or shutdown. With less work in the heating furnaces because of the shorter cycle, scale loss is less if forging must be stopped temporarily. There is no need for warm-up time; the induction units will heat at full capacity as soon as they are turned on.

• The change has improved working conditions and scheduling.

Park says much better working conditions have resulted from the absence of exhaust gases and the reduction in radiant heat except from the crankshafts themselves. And the shortening of the heating time with improved control has not only aided scheduling, but permitted better use of manpower.

Reliance develops first line of solid state regulators for variable speed drives

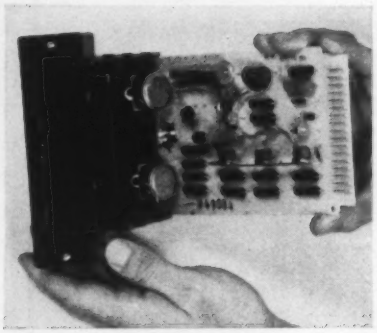
. . . gives you better circuits, precise control, less maintenance.

Reliance has produced the first complete line of solid state regulators and exciters for variable speed (V*S) drives and Engineered Drive Systems. These new devices, using power silicon rectifiers and diodes in place of tubes, achieve precise motor control, 1/10% regulation at base speed, with response times up to twice as fast as tube-type regulators. Here is a major advance in variable speed control, and a major advantage for the industrial user. Reliance Drives with these new regulators are now available to you in 1 to 1500 horsepower.

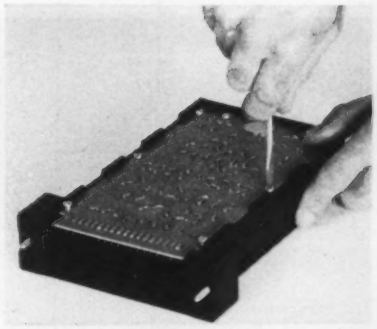
Reliance research and development brings you a more efficient drive than ever before . . . and a notable refinement of already well-engineered systems.

The pictures on the facing page tell the story.

RELIANCE . . . builders of the tools of automation

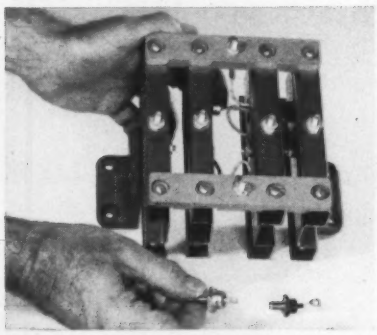


1. Heart of the system is new "Cardpak" control circuit, with transistors, capacitors and resistors to amplify feed-back signals.

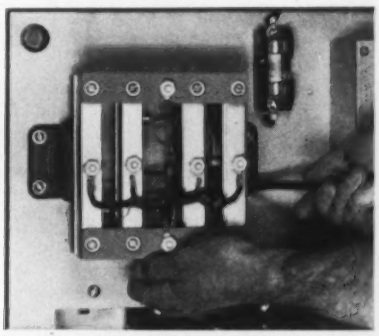


2. Each plug-in "Cardpak" module is a complete control circuit...can be quickly checked and easily replaced, if ever necessary.

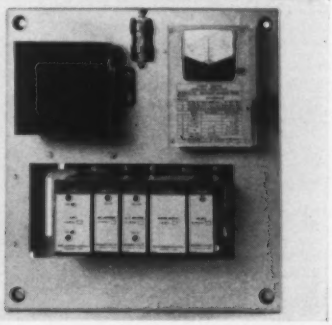
3. Each V★S Drive control system is tailored to your specific job . . . with "Cardpak "circuits pre-engineered for reliability, fast delivery.



4. Power silicon controlled rectifiers and diodes, instead of tubes, are among the most reliable components yet devised.



5. The rectifiers, mounted on copper plates for heat radiation, operate over a wide temperature range with no special cooling.

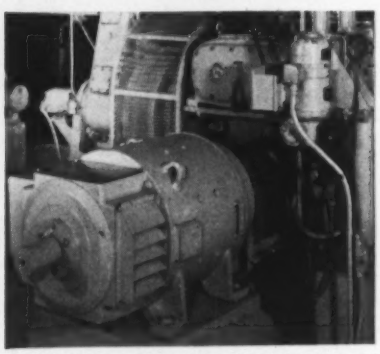


6. Complete panel can be checked quickly for start-up and trouble shooting with the optional test fixture . . . one meter, one knob.

7. Motor control is precise . . . 1/10% regulation at base speed, with response times up to twice as fast as tube type regulators.

8. The Reliance V★S Drive control cabinet is 35% smaller than conventional drives. Cabinet can be located where convenient.

9. Operator's station centralizes drive operation. Multiple stations, bench boards, pendent stations and special controls available.



10. The Super-T D-c. Motor . . . integral part of the V★S Drive. It's rugged . . . absorbs repeated 100% overloads for one full minute.

Your nearest Reliance Systems Engineer will give you all the facts . . . help you apply Reliance V★S Drives to your products and processes. Call him through the Yellow Pages, or write us direct.

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National Castings Co., Cicero 50
Peoria Malleable Castings Co., Peoria 1
Wagner Castings Company, Decatur

INDIANA
Albion Malleable Iron Company, Muncie Division, Muncie
Link-Belt Company, Indianapolis 6
National Castings Co., Indianapolis 22

IOWA
Iowa Malleable Iron Co., Fairfield

MASSACHUSETTS
Belcher Malleable Iron Co., Easton

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Frazer & Jones Company Division, The Eastern Co., Solvay
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OHIO
American Malleable Castings Co., Marion
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Dayton Mall. Iron Co., Ohio Mall. Div., Columbus 16
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Lancaster Malleable Castings Co., Lancaster
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Meadville Malleable Iron Co., Meadville
Pennsylvania Malleable Iron Corp., Lancaster

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West Virginia Mall. Iron Co., Point Pleasant

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Chain Belt Company, Milwaukee 1
Federal Malleable Company, Inc., West Allis 14
Kirsh Foundry Inc., Beaver Dam
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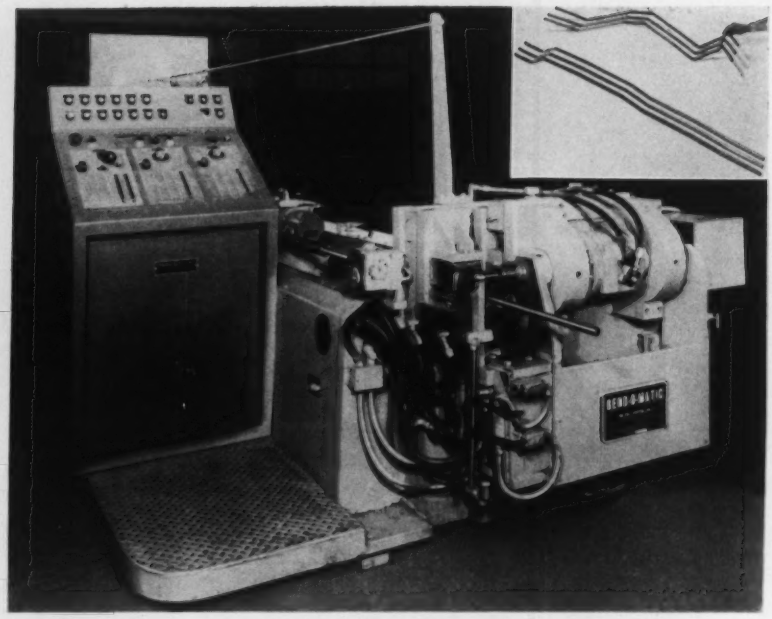
Milwaukee Malleable & Grey Iron Works, Milwaukee 46

These companies are members of the Malleable Castings Council



Versatility, accuracy emphasized as . . .

Punched Tape Controls Tube Bending Machine

• A NUMERICALLY controlled machine designed to bend aircraft and missile tubing up to 1¼ in. in diameter and 8 ft long has a number of other possible applications, says the developer, Nu-Era Gear Corp., Rochester, Mich.

The machine was designed and built by Walter P. Hill Inc., Detroit.

It is equipped with General Electric tape controls.

Bend and twist angles can be held to tolerances of ±1/20 of a degree and distance between bends to ±0.005 in. The unit can handle a variety of tubes of different tempers without springback. Set-up time is about 35 minutes against an average of 4 hours for conventional benders, estimates Nu-Era. The company introduced a similar machine for bending exhaust tailpipes last year (STEEL, Feb. 1, 1960, p. 98).

• Possible applications include bending of reinforcing rods for the construction industry, tubular furniture operations, and various electrical and plumbing installations in the building field, says Phillip S. Chapnick, Nu-Era's president.

Existing dies from any standard, conventional bending machine can be accommodated. Adapter blocks are provided that will fit any existing bending tooling.

In operation, a section of prototype tubing is hand formed to shape. Distances between bends, degrees of bend, and angles of twist are measured and their numerical values punched into the initial control tape. As the machine makes the first part, it also punches a tape that can then be used to produce as many parts as necessary.

Addition of a tape writer and reader to conventional tube bending equipment is said to eliminate the need for maintaining costly fixture inventories for replacement parts for aircraft tubing.

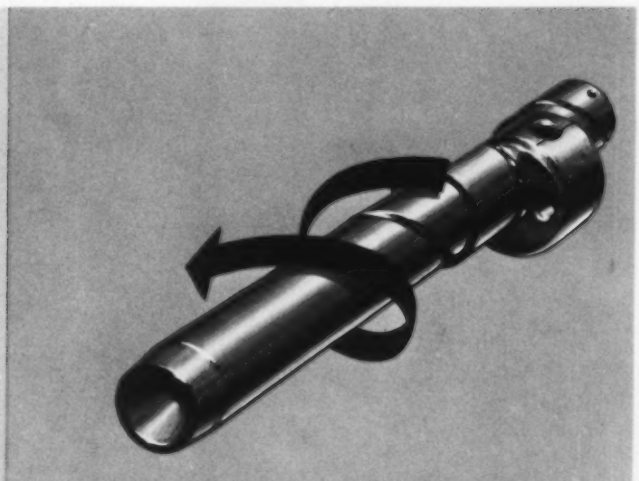
Post-Forming: New Way to Bigger Savings with Malleable Castings

The ductility of Malleable iron castings permits use of high-speed forming techniques to finish Malleable parts at lower cost. Take advantage of the versatility you get only with ferritic and pearlitic Malleable castings. For a fuller understanding of how Malleable can help you, call any producer that displays this symbol —

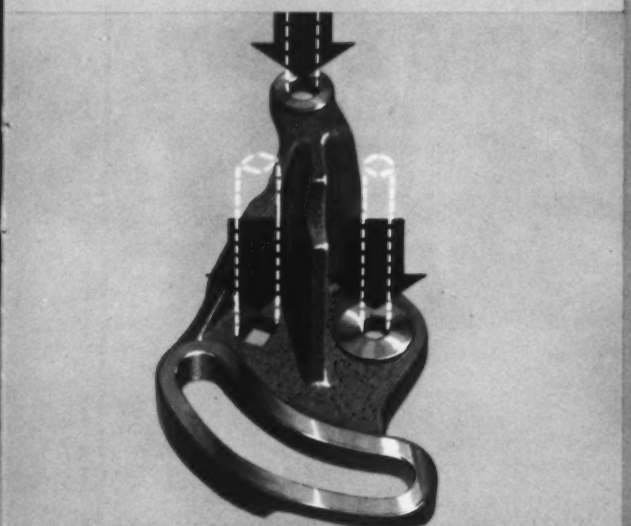
Free Folder describing these techniques is available for your use. Just ask any member of the Malleable Castings Council for Data Unit No. 116, or write to Malleable Castings Council, Union Commerce Building, Cleveland 14, Ohio.

MEMBER
MALLEABLE
CASTINGS COUNCIL

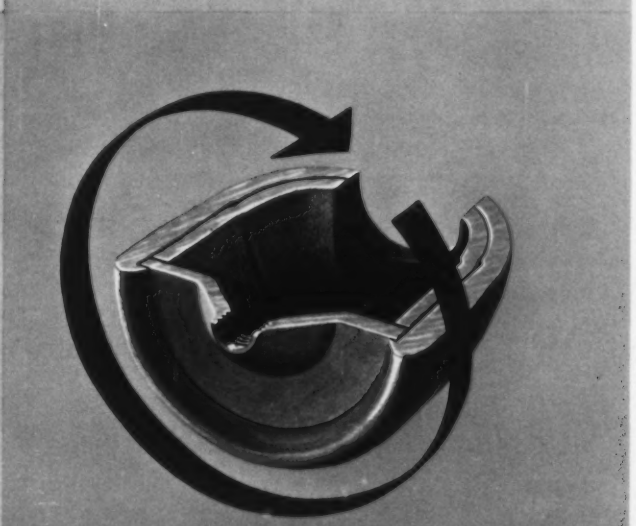
Hot Form It — Hot coining this Malleable transmission part reduces finished cost . . . eliminates three cutting operations required by the previously used steel part.



Roll It — Oil grooves in lawnmower crankshafts and splines in compressor crankshafts are just two of many places where rolling proves more economical than machining.

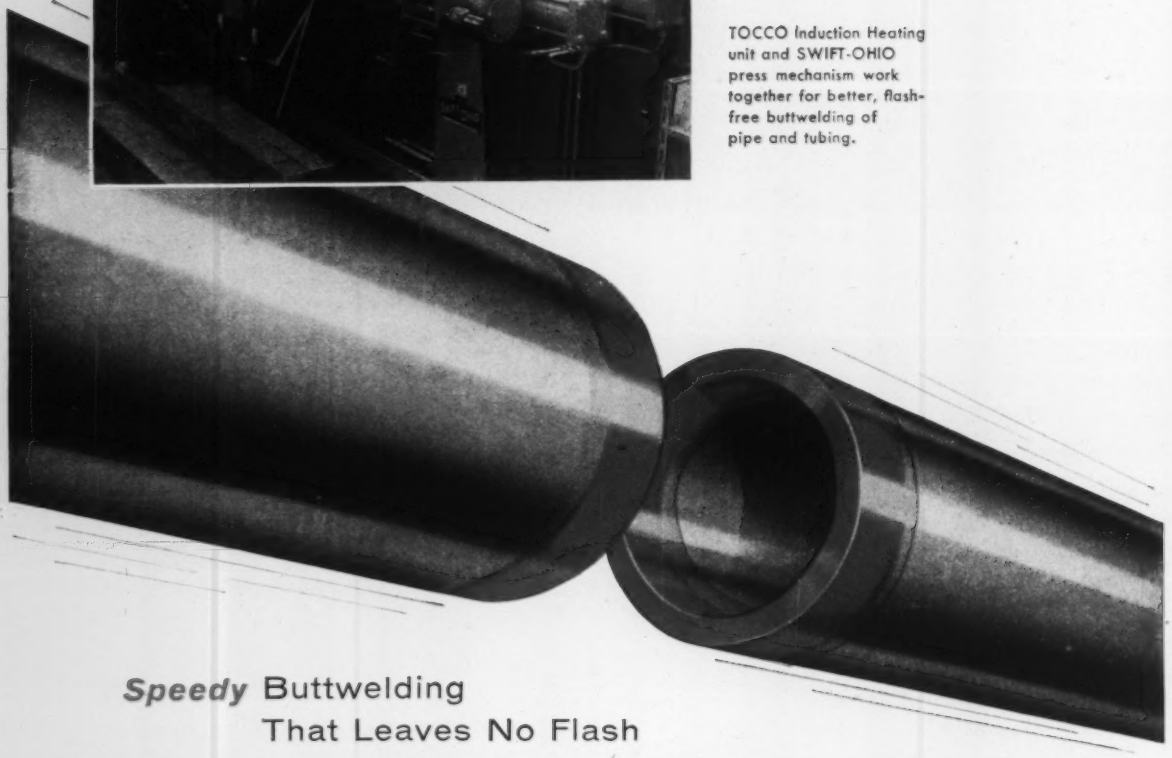


Punch It — Holes with diameters greater than the thickness of the metal can be punched in Malleable. Two round holes and a square hole are punched simultaneously in this idler arm.



Spin It — Malleable's ductility permits the sleeve and end disc in this ball joint to be held in place by spinning the Malleable housing into a strong, permanent flange.

TOCCO Induction Heating unit and SWIFT-OHIO press mechanism work together for better, flash-free buttwelding of pipe and tubing.



Speedy Buttwelding That Leaves No Flash

with TOCCO* Induction Heating

Now, in less than a minute you can get flash-free, smooth joints on any size pipe, regardless of its diameter or wall thickness.

Conventional buttwelding methods produce strong, sound joints but leave a brittle flash inside or outside the pipe. Inside flash can seriously impede fluid flow. Particularly on long lengths of pipe, removal of this inside flash is a real production headache—time consuming and expensive.

Whether *your* production bottleneck involves buttwelding, soldering, brazing, heat treating or forging, it pays you to investigate TOCCO as an economical way to do it better, faster and at lower cost.

THE OHIO CRANKSHAFT COMPANY

Mail Coupon Today—NEW FREE Bulletin

The Ohio Crankshaft Co. • Dept. S-7, Cleveland 5, Ohio

Please send reprint of article from STEEL Magazine entitled "Buttwelder Leaves No Flash".

Name_____

Position_____

Company_____

Address_____

City_____ Zone____ State_____

Setup Duplicates, Compares Punched Tapes

EASE AND reliability in duplicating and comparing 5, 6, 7, or 8 bit codes automatically are provided by this tape-to-tape regeneration comparator system. Two motorized tape readers connected with a motorized tape punch help insure accurate, fast verification and duplication of tapes punched by Flexowriter's automatic writing machine (shown in the foreground) or by other tape producing machines.

In numerical control systems application, a tape duplicated from one that has been in use for some time is compared with the original. Each is placed in a reader and read simultaneously at 1200 codes per minute. When an error is detected in the new tape, the reader stops and indicates the error's position.

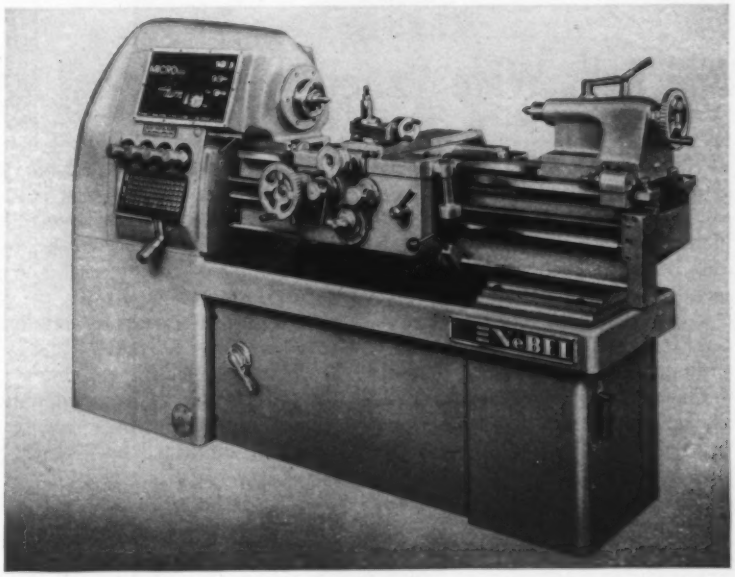
For further information, *write* Promotion Planning Dept., Friden Inc., 97 Humboldt St., Rochester 2, N. Y.

Lathe Has Constant Horsepower at All Speeds

INFINITELY variable spindle speeds with constant horsepower are featured on a high speed precision lathe (Micro-Turn) improved by Nebel.

A mechanical speed variator drive unit and a coaxial spindle design help provide an infinite selection of spindle speeds throughout a continuous range from 43 to 3500 rpm. Output speed is maintained within 0.2 per cent. A built-in torque response mechanism in the main drive prevents slippage under starting or shock loads.

In the low speed range (up to 400 rpm), the lathe operates through a planetary gear unit. In the high speed range (above 400 rpm), headstock coaxial sections lock into a single unit and the lathe operates without gearing through



matched multiple V-belts (directly from main drive to spindle).

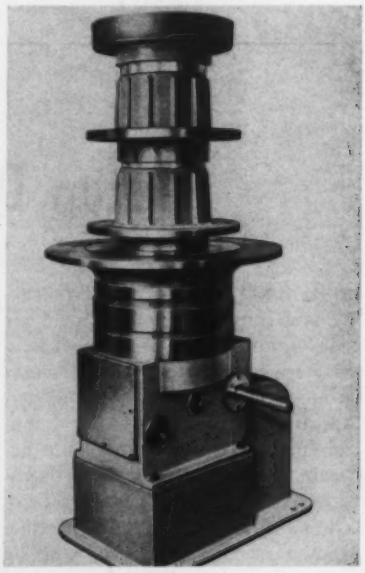
Shifts between high and low speed ranges can be made while the spindle is rotating or stationary. Pushbuttons control spindle speed. A direct reading tachometer is provided. A pressure lubricated gear box provides 60 thread and 60 feed changes.

For further information, *write* Lathe Div., Nebel Machine Tool Corp., 3406 Central Parkway, Cincinnati 25, Ohio.

Turret Indexing Designed For Sequential Assembly

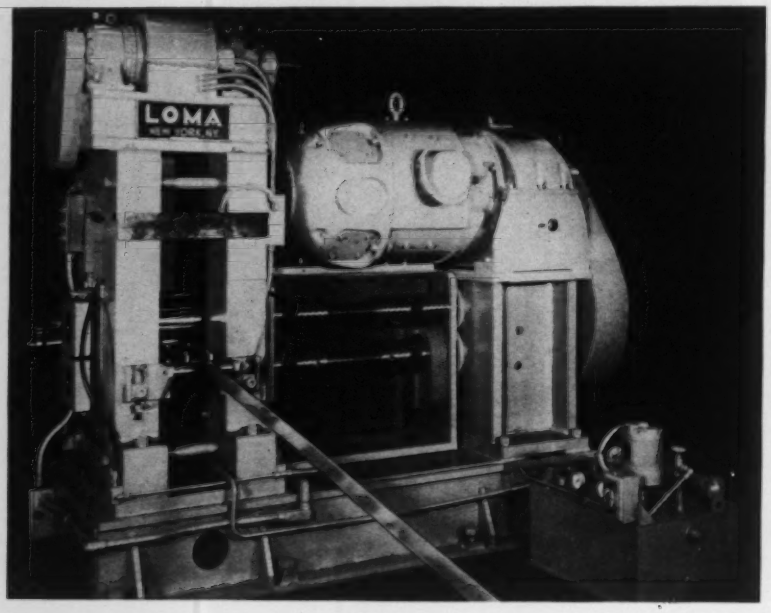
SEQUENTIAL assembling and processing can be done at high speed with the Model SD, Swanson-Erie, turret indexing machine chassis. It's available in a wide range of turret diameters, index positions, and work cycles.

It uses double, overhead tool plates for mounting and actuating operational tooling. The self-contained chassis increases operating efficiency through: 1. Positive parts control. 2. Reduced jamming potential. 3. Design simplicity. 4. Tooling accessibility. 5. Tool standardization.



Tools are center mounted, facing outward, with provision for feeding, probing, orienting, and parts escapement. In addition, tooling such as hoppers and processing equipment can be mounted on external brackets around the outside of the turret and actuated mechanically by cams and levers operated from the main camshaft or auxiliary countershafts.

For further information, *write* Swanson-Erie Corp., 816 E. Eighth St., Erie, Pa.



Mill Rolls Wide Variety of Work

IT'S POSSIBLE to do a wide variety of metallurgical processing work on a single mill facility with a two high, four high combination rolling mill developed by Loma. The equipment is suitable for both hot and cold work and allows both shapes and flat stock to be rolled, with or without the application of tension.

The company says heavy duty design allows the mill to make reductions of more than 50 per cent per pass while maintaining tolerances as close as 5 per cent of thickness. Changeover from 8½ x 10 in., two high to the 2½ x 8½ x 10 in., four high setup takes only 30 minutes. The two high arrangement is used for hot and cold breakdown rolling of plates and sheets. Grooved rolls are available to process rounds, squares, and other shapes. In the four high setup, strip is cold finish rolled to gages as thin as 0.002 in. A heavy duty, 25 hp, variable speed drive is used on the combination rolling mill. Bearings are continuously lubricated by a closed oil circulating system.

For further information, *write* Loma Machine Mfg. Co. Inc., 114 E. 32nd St., New York 16, N. Y.

Saw Cuts Stainless Steel, Doesn't Need Coolants

CARBON and stainless steels and many of the new alloys can be cut accurately with the Promacut Uni-14SA cutoff saw and pedestal grinder. Coolants are not necessary, says the company, nor are clamps.

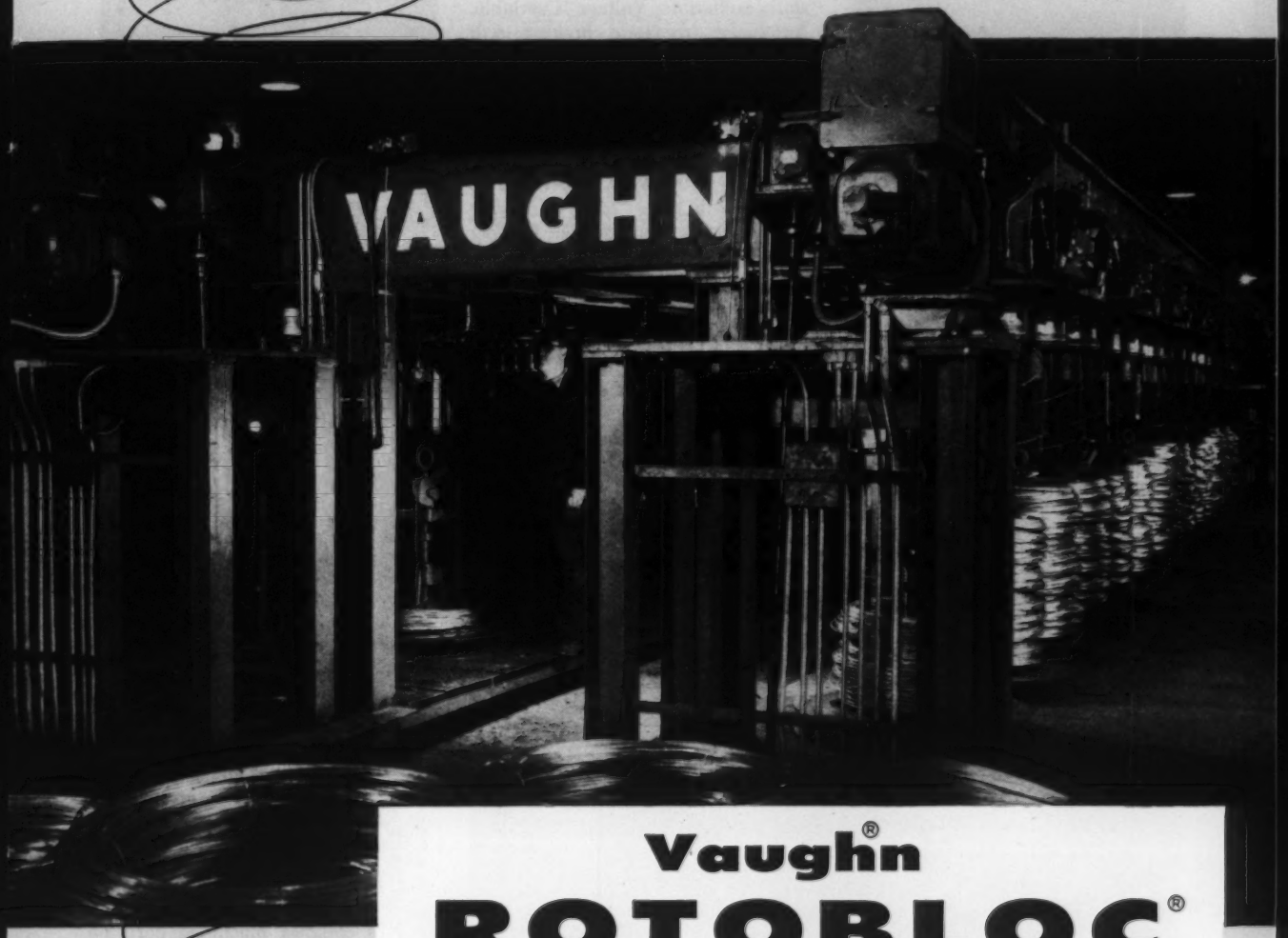
Straight cuts, miters, notches, and incisions can be made. Like the larger Promacut models, the unit produces a semimilling action rather than biting and chipping, adds the manufacturer. Speed of rotation and high torque of the direct drive motor (5 hp) moves the blade through the stock so fast that heat is not absorbed and the result is an almost burrfree cut with no bluing.

Through cuts on 2 x 2 x ⅛ in. angles are made in 1 second or less. The blade is rated for up to 2500

Large bundle–non-stop operation

without twist!

FOR USS AT DONORA WORKS, AMERICAN STEEL AND WIRE DIVISION



Vaughn® ROTOBLOC®

GALVANIZING · ALUMINIZING · PATENTING

This impressive 32-block Rotobloc installation underscores the increasing acceptance of Vaughn non-stop bundle production by leaders of the wire industry. The Vaughn Rotobloc, operating at the end of your wire processing lines, assures uninterrupted flow that means better deliveries for the customer and lower costs in the mill.

● This machine may be built in any number of blocks, and can also be designed for drum payoff, if desired. Size range is from 16 gauge galvanized to 13/32" patented wire. For additional details, write.

THE VAUGHN MACHINERY COMPANY

CUYAHOGA FALLS, OHIO, U.S.A.

COMPLETE COLD DRAWING EQUIPMENT—Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.

V®

such cuts before resharpening. The head and column will clear a 15 in. plate on a through cut, making the unit suitable for production cut-off runs from long sections of wide stock.

For further information, *write* Production Machinery Inc., 4941 W. Belmont Ave., Chicago 41, Ill.

Maker Simplifies Planer Drive Design

A SIMPLIFIED, 60 hp, planer drive consists of a Life-Line H reversing drive motor of low rotor inertia, a 3600 rpm unit frame motor-generator set, and a simple control with static excitation. Voltage is variable. Automatic, dynamic braking will stop the planer instantly upon power failure.

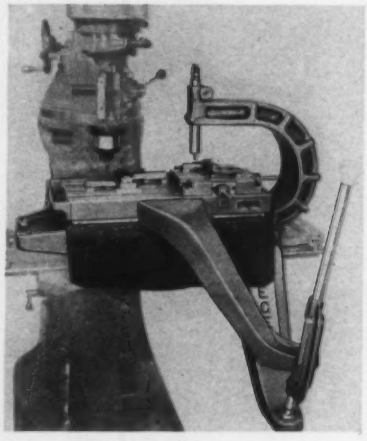
The unit can develop about 6600 lb pressure on the tool at 150 ft per minute and is capable of operating from 30 up to 300 ft per minute with a 6 to 1 gear ratio. In addition, the drive can deliver 150 per cent load for 3 minutes for plowing through heavy stock sections without slowdown.

Speed of cut and return direction are independently adjustable from 30 to 300 ft per minute. A time delay is included in the control to automatically shut down the unit after a predetermined period of idle running (adjustable up to 15 minutes). Restart is controlled from the pendant station.

For further information, *write* Westinghouse Electric Corp., P. O. Box 2099, Pittsburgh 30, Pa.

Redesign Improves Line of Duplicator Tables

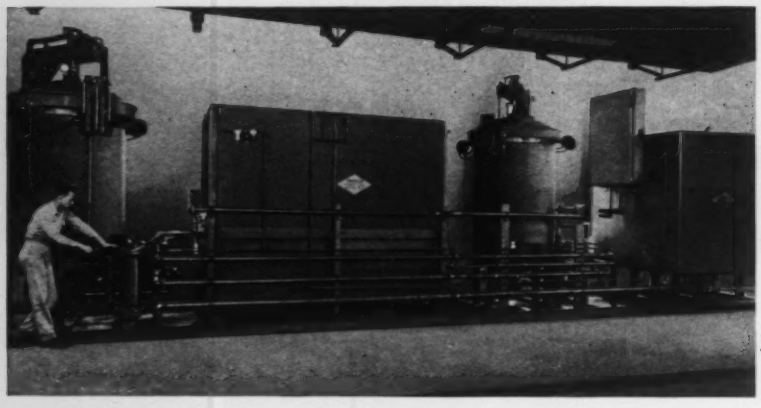
GREATER efficiency and easier operation are the results of design improvements made to the Regent line of two and three dimensional, duplicator tables.



Among the improvements is a redesign of the duplicator's ball bearing raceways for greater rigidity and smoother operation. The redesigned of the overarm also contributes to rigidity, says the maker.

Included in the line is the R-200, a two dimensional, fluid motion duplicator for contour profiling on any vertical miller and the R-300 for fast, accurate, two and three dimensional, duplicating and profiling of complex machined parts on Birdgeport millers only.

For further information, *write* J. M. Kalins & Co., 1575 Railroad Ave., Bridgeport, Conn.



Low Cost Unit Impregnates Castings

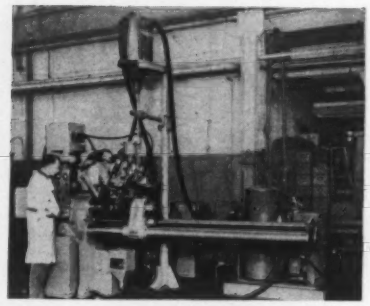
THIS batch type, casting impregnation machine uses a single steam jet to provide vacuum for both autoclaves. Advantages of lower initial equipment costs and improved operating economy are claimed by the company. The machine is designed for pit installation.

The unit shown is intended for sealing cast aluminum, automotive transmission cases with a metal oxide type sealant. It consists of two autoclaves (680 gallons working capacity each), a sealant tank (2100 gallons), a hot inhibitor rinse tank (1600 gallons), and a cold water rinse tank (1600 gallons).

For further information, *write* Prenco Mfg. Co., 2605 W. 14 Mile Rd., Royal Oak, Mich.

Unit Welds Irregular, Two Dimensional Contours

A CAM controlled, universal welding machine that automatically welds any two dimensional, irregular contour (including contours with straight or concave sections) is cited as one solution to the problem of designing and building spe-



cial purpose units for each application.

The unit consists of a headstock, tailstock, and welding head. Parts being welded are held between the headstock and adjustable tailstock. Any welding process can be adapted to the machine, says the maker. Three simple plate cams control rotary part speed, and horizontal and vertical welding head positions.

Welding speed can be varied.

For further information, *write* Expert Welding Machine Co., 17144 Mt. Eliott Ave., Detroit 12, Mich.

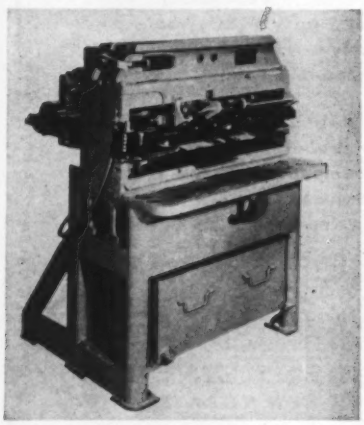
Unit Knurls up to 4 in. On 20 in. Long Shafts

FAST shaft knurling (up to 4 in. on shafts up to 20 in. long and 5/8 in. in diameter) can be done on the Model 101 unit.

The work is rolled between two flat knurl blocks. The upper block is fixed.

A feed plate (cam actuated to move at one-half the speed of the lower knurl block) guides the work. Parts may be hand or hopper fed into the loading chute. Finished parts are ejected automatically onto a drain tray.

For further information, *write*



Morley Machinery Corp., 3111 Winton Rd. S., Rochester 23, N. Y.

Control of Rancidity, Rust Cited for Cutting Fluid

THE COMBINATION of rancidity and rust control in a cutting fluid called Five-Star Cimcool permits a wide application to problem jobs, says the manufacturer. Long tool and fluid life and high production rates are reported.

Field tests indicate two rust inhibitors in the product provide thorough protection at dilutions as lean as 1 part of concentrate to 60 parts of water.

In one application, the effectiveness of the rust control enabled a manufacturer to skip an oil dip between machining operations. A bactericide is included in the fluid.

For further information, *write* Cincinnati Milling Products Div., Cincinnati Milling Machine Co., 4701 Marburg Ave., Cincinnati 9, Ohio.

How our small plant solved its waste disposal problem WITHOUT CAPITAL OUTLAY...

Pat. No. 2,900,096

DEMPSTER-DUMPMASTER Equipped Hauler Provides Containers and Service for Small Fee

Our small Midwestern manufacturing firm did not generate enough refuse to justify ownership of its own refuse disposal system. Yet, it was plagued by unsightly trash piles, fire hazards and scattered refuse in the plant yard.

Our plant engineer then heard of a DEMPSTER-DUMPMASTER equipped private hauler in the adjoining city. A survey revealed that two big-capacity refuse containers, placed one at each end of the plant, would handle the entire refuse accumulation.

The private hauler placed the containers, and a small monthly fee covered maintenance, labor, hauling and dumping refuse. No capital outlay was involved, disposal costs were reduced, and plant housekeeping was vastly improved.

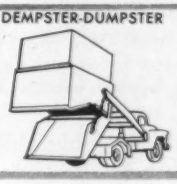
In all major cities, private haulers who own DEMPSTER-DUMPMASTER equipment render fast, efficient, low-cost refuse storage and collection service. They place one or 100 containers at your service for a reasonable fee. A free brochure describes their service in detail.

Free Brochure and Name of Nearest Private Hauler on Request

Dept. S-72, DEMPSTER BROTHERS Knoxville 17, Tenn.

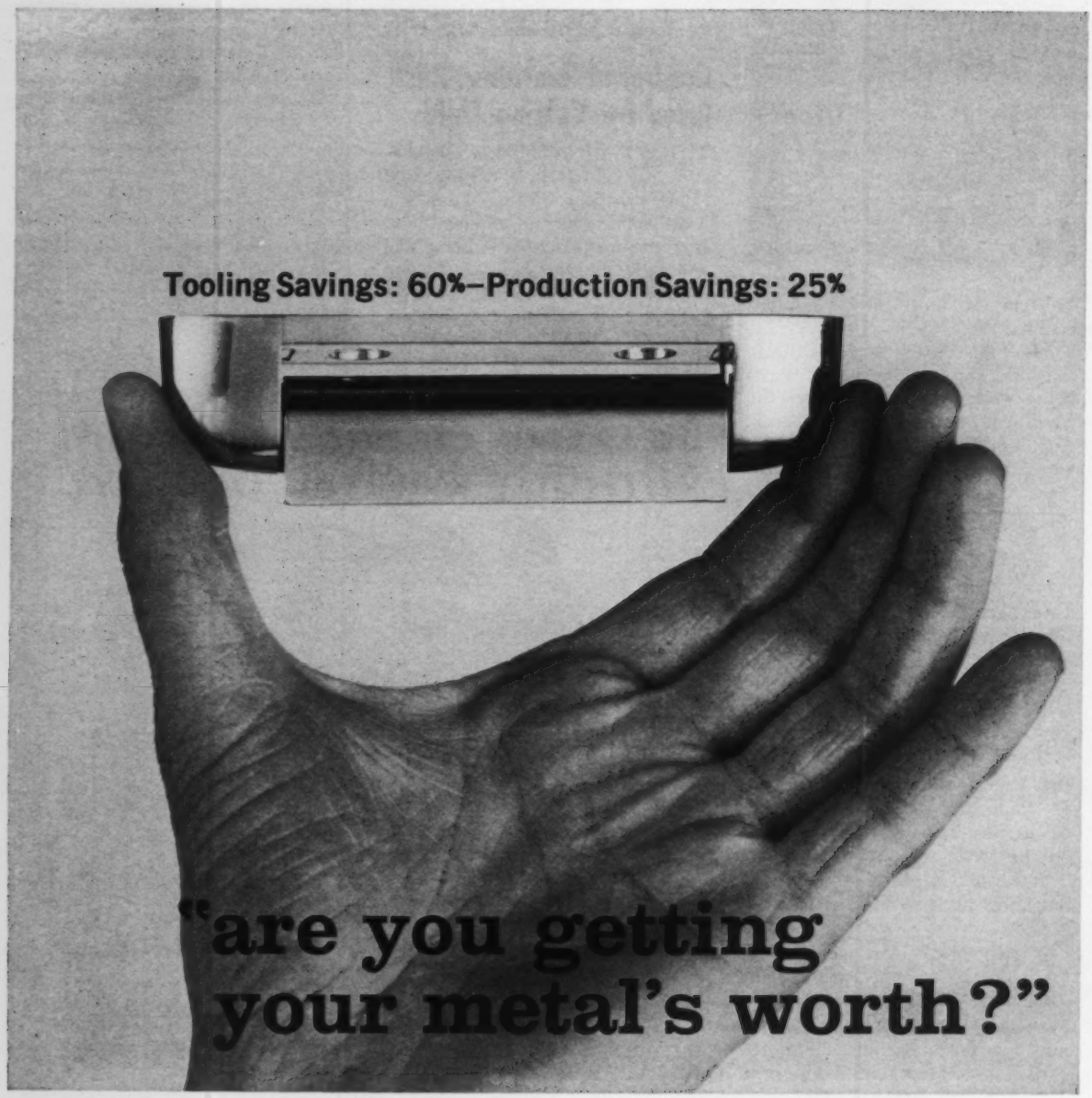
DEMPSTER-DUMPMASTER

DEMPSTER-DUMPSTER



PART OF THE DEMPSTER DUMPSTER® SYSTEMS

Tooling Savings: 60%–Production Savings: 25%



"are you getting your metal's worth?"

If time and money were no object, you could assemble this refrigerator door hinge from a steel stamping, a brass stamping, screw machine parts and just one die casting. Then you could keep busy with some tricky operations necessary to attach the hinge halves – drilling blind holes accessible only with an angle drive drilling head and staking steel pins in the holes.

However, Die Cast Products, Inc. of Gardena, California prefers the 60% reduction in tooling costs and the 25% drop in production costs achieved by a unique design using four zinc die cast components which are cast in one shot and trimmed in one operation. That way they are faced with no other secondary operations before plating – and assembly is simple.

To find out how to put zinc die castings to work for you, see your nearest die caster for information about their properties, use, design techniques and machining practices. REMEMBER – ZAMAK GIVES YOU MORE FOR LESS. ARE YOU GETTING YOUR METAL'S WORTH?

NJZ

HORSE HEAD PRODUCTS

THE NEW JERSEY ZINC CO.

160 FRONT STREET · NEW YORK 38, N.Y.

NEW literature

Write directly to the company for a copy

Steel Bar Case Histories

Eleven case studies discuss applications of "Fatigue-Proof" steel bars. Included: A main driveshaft for a heavy duty lathe, an adjusting screw for a sheave, a coil winding machine adapter, a cage screw pin, and an armature shaft for a floor surfacing machine. Ask for Case Study Portfolio No. 3. LaSalle Steel Co., P. O. Box 6800-A, Chicago, Ill.

Slitter Knife Calculator

A calculator for determining clearances of slitter knives consists of a double plastic wheel. When it is set so that an arrow points to the thickness of the material, windows show the recommended horizontal and vertical clearances. The back of the calculator gives clearance suggestions for side trimming strip and plate steel. Heppenstall Co., 4620 Hatfield St., Pittsburgh 1, Pa.

Gray Iron Castings Guide

A buyers' guide and membership directory, *Where to Buy Gray and Ductile Iron Castings*, contains an alphabetical listing of member gray and ductile iron foundries with specific data on personnel, monthly production, size, type and use of castings, foundry classifications, type of iron produced, and specific facilities. Trademarks and a geographical listing are also presented. Gray Iron Founders' Society Inc., National City-E. 6th Bldg., Cleveland 14, Ohio.

Grinding Stresses

An 81 page booklet entitled *Grinding Stresses: Cause, Effect, and Control*, comprises the collected papers which have been published as articles in the trade press, and is based on research sponsored by the Grinding Wheel Institute and the Abrasive Grain Association at the Mellon Institute. Grinding Wheel Institute, 2130 Keith Bldg., Cleveland 15, Ohio.

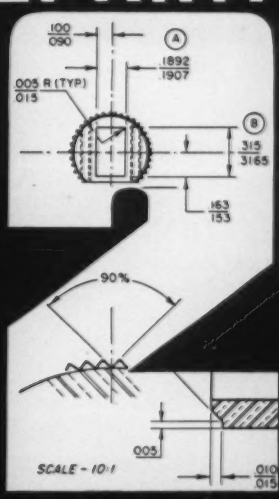
Beryllium Copper Alloys

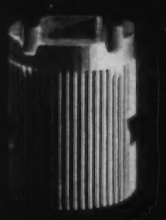
Technical information on two high strength and two high conductivity beryllium copper strip products is included in four data sheets. The sheets show physical and mechanical properties and provide information on methods of heat treating, forming, joining, and plating of beryllium copper. Brush Beryllium Co., 5209 Euclid Ave., Cleveland 3, Ohio.

Numerical Control

A 32 page booklet presents educational data on numerical controls for machine tools. The booklet defines the meaning of numerical control and explains the use of punched tape in machine tool applications. Other subjects covered include programing tapes, standardizing punched tapes, and standardized programing. Promotion Planning Dept., Friden Inc., 97 Humboldt St., Rochester 2, N. Y.

BLUEPRINT FOR





Transforming these lines and numbers into the functional reality of a sintered brass brush holder for small electric actuator motors took teamwork. A design engineer conceived it, and a metal powder fabricator brought it to fruition—at a 65% cost saving over the previous method of manufacture.

It might not have been this way. Despite a design engineer's careful planning, his blueprint could be a neatly drawn recipe for an ulcer – when looked at by a metal powder fabricator aware of the advantages and limitations of his art. Often, a fabricator has little choice but to turn out a part he knows could be made infinitely better—could be made with increased reliability, more wearability, less machining and lower costs.

Working together, the metal powder fabricator and design engineer make economical mass production of critical parts a reality. And we also mean "critical" in the sense that a whole is no better than the quality of its most prosaic part. For more information about the design, application and advantages of nonferrous metal powder parts, write today to The New Jersey Zinc Company for your copy of "Designing For Pressed Brass and Nickel Silver Parts."

Part by KWIKSET POWDERED METAL PRODUCTS

Division of American Hardware Corporation

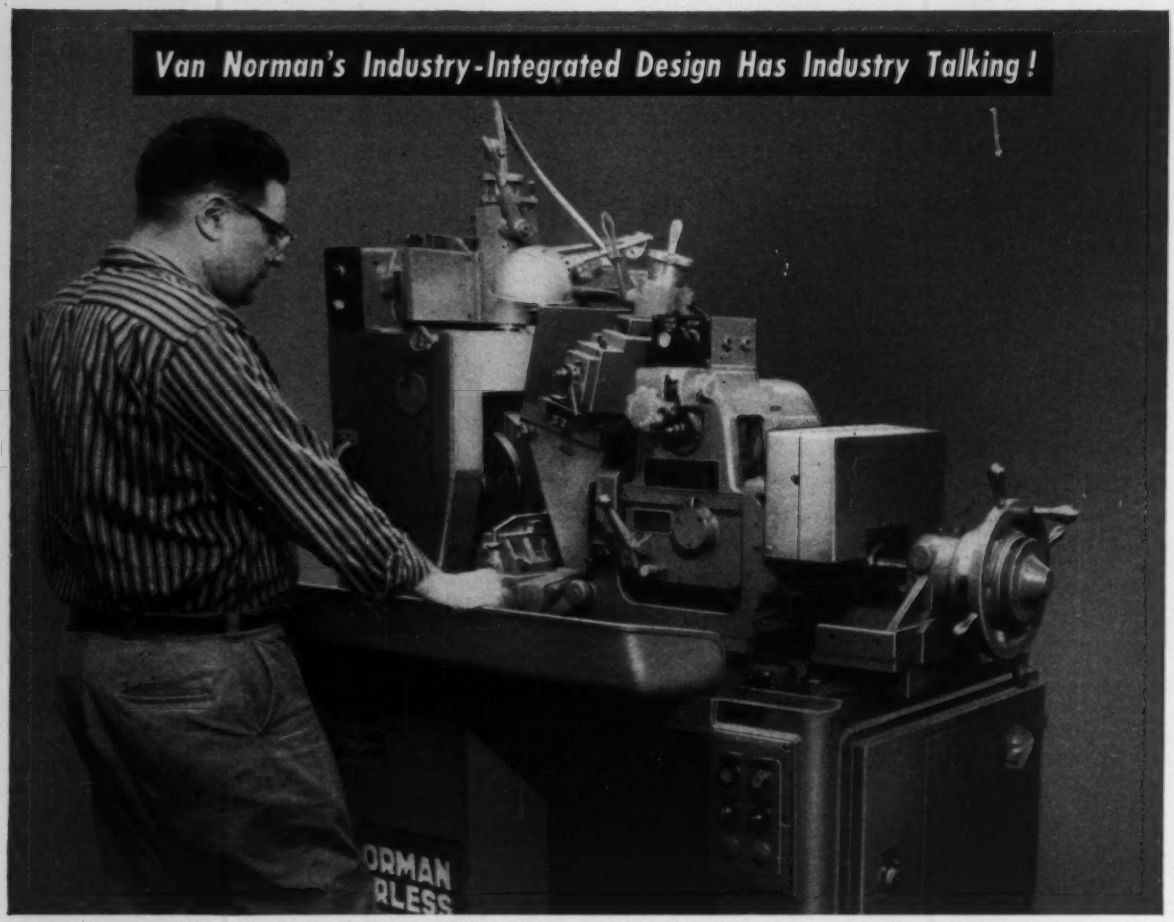
HORSE HEAD® ATOMIZED NONFERROUS METAL POWDERS ARE PRODUCED BY

THE NEW JERSEY ZINC COMPANY

160 FRONT STREET • NEW YORK 38, N. Y.

DEVELOPERS OF BRASS & NICKEL SILVER POWDERS SETTING TODAY'S STANDARDS

HORSE HEAD PRODUCTS



HOW MICRO SWITCH FINISH GRINDS SMALL PARTS TO .0001"

Van Norman Centerless Grinders meet rigid design limits of famous precision snap-switches at high output-rate

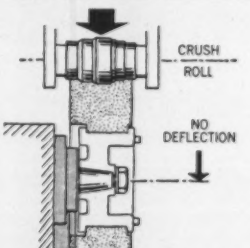
Close tolerances in vital parts are indispensable to MICRO SWITCH, suppliers of over 12,000 types of precision switches to home, industry, defense. This division of Minneapolis-Honeywell Regulator Co. gets accuracy and economy with VN Grinders.

.0001" on Thru-Feed—.0002" on infeed are met by VN units in volume-grinding actuator shafts and plungers for snap-action switches. Specs for multi-diameter concentricity and micro-inch finish are continuously held at high outputs (1,000 to 2,000 parts per hour on thru-feed; 120 to 250 on infeed).

Fast, Smooth, Vibrationless Operation is designed into VN Centerless Grinders. Massive Construction—well-coordinated components—lifetime-sealed spindle units. Result: strict control over work deflection . . . no warm-up, no chatter, no "creep." VN hyd. profile diamond dressing on both wheels, with cams for straight or multi-diameter parts.

Variable Speeds, Easy Set-Up, Operation Control. Two regulating wheel speed ranges: 13–80 and 140–830 RPM. Capacity 0–1½" dia. Optional: VN Crush Dressing Attachment.

Free Booklet.—"Centerless Grinding"—valuable guide to high production, lower costs. For your copy, contact factory or your local distributor.



Rugged, heavy Grinding Wheel Spindle with its additional bearing extension withstands the terrific pressures of crush roll forming with NO DEFLECTION.

2809

VAN NORMAN MACHINE COMPANY

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Steel Market Has Firmer Tone

STEEL DEMAND is trending upward as metalworking plants end their vacations and automakers prepare for initial runs on 1962 models.

In the East, buying appears to be running slightly ahead of consumption. Users whose inventories are abnormally low are increasing their stocks moderately because of improving business prospects. Although the mills are still offering fast service on most products, some buyers are protecting themselves against the possibility of extended deliveries in the fall. They realize that if they wait until their suppliers start quoting four weeks instead of two, other users whose inventories are at a minimum may rush into the market and start competing with them for tonnage. Four week promises could go out to six or seven weeks overnight.

APPLIANCE MAKERS BUYING— In part, the market's better tone reflects improved sales of household appliances. Washer, range, and refrigerator manufacturers are recalling laid off workers and stepping up production. Result: Better demand for cold rolled sheets, silicon steel, and enameling stock.

AUGUST OUTLOOK BRIGHTENS— Although orders for August came in at a snail's pace in July, the total by the end of the month was fairly good. Chicago steelmakers, who predicted two weeks ago that August shipments wouldn't equal July's, are talking more optimistically. They now believe shipments will be slightly lower than July's on a daily average basis (because August has three more shipping days) but 5 to 10 per cent higher in the aggregate.

UPTURN DEFERRED?— Despite negligible progress in negotiations for new labor contracts to replace the ones expiring Aug. 31, automakers are ordering normally for August and September. August shipments to the automotive industry will be up slightly from July's, reflecting the start of 1962 model production. Automotive orders for September are disappointing to mill executives who had heard that the car companies were planning near-record output for the month. Says a Pittsburgh producer: "The orders we've had certainly don't point to a big buildup. It looks like we'll have to wait until October for that."

CALLS FOR HIGHER PRICES— The coming boost in steelworker wages "emphasizes the need for an increase in the price of flat rolled steel products," says Nicholas P. Veeder, chairman, Granite City Steel Co., Granite City, Ill. He points out that employment costs for his company will go up 3.1 per cent Oct. 1, making the total increase about 10 per cent since 1958.

Prices of some threaded fasteners are being increased 4.5 to 5 per cent.

IMPORTS RISING— Latest figures from the Commerce Department show that imports of steel mill products in May (266,000 tons) exceeded exports (159,000 tons) for the sixth consecutive month. Although imports through May were only half as large as they were in the corresponding period of 1960, they topped exports by a sizable margin—1 million vs. 744,000 tons.

PRODUCTION HOLDS— Look for ingot production in the week ending Aug. 5 to be about the same as the 1,860,000 tons that STEEL estimates the industry poured in the week ended July 29. Output then was 0.1 per cent above the previous week's. July's production was about 8.1 million ingot tons (vs. 8,551,000 tons in June).

WHERE TO FIND MARKETS & PRICES

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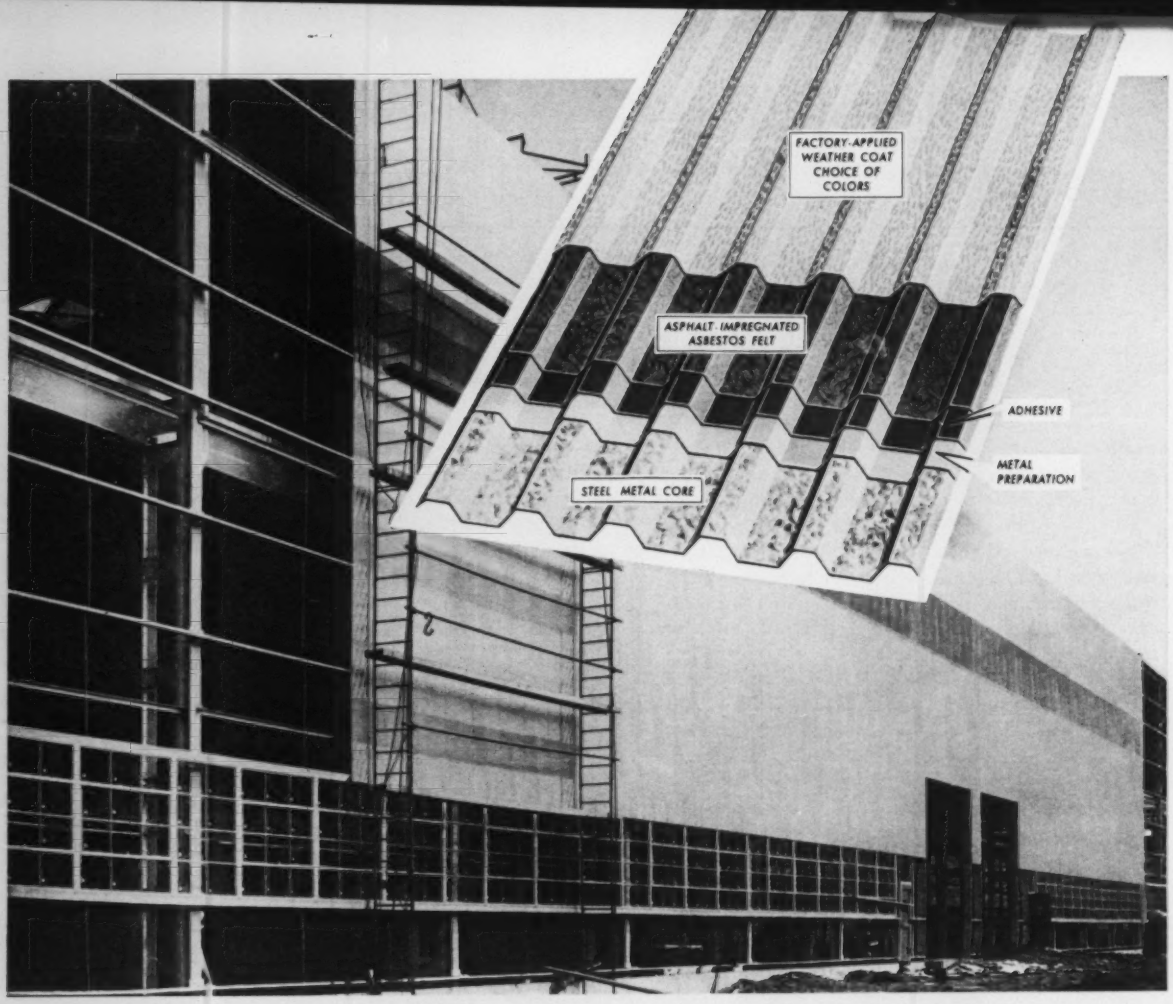


Inset shows how panels for commercial and industrial buildings are constructed to provide strength, durability, and good appearance

Building Panels Take On New Luster

IF THE TWO biggest markets for your product start to collapse, what should you do?

That's what makers of protected metal asked themselves in 1954. They found an answer, and they're still in business. They've upped their sales to a record-equaling $10 million a year. But they're not satisfied. Reason: Commercial and industrial metal clad buildings use at least $100 million worth of siding and roofing annually.

To get a bigger share of the market, protected metal must displace aluminum and galvanized steel. It may find an even greater potential by competing successfully against nonmetallics, such as corrugated asbestos and masonry.

• **Old Products**—Protected metal was introduced in the early thirties as a black, corrugated steel sheet. Originally, it was 18 to 24 gage metal topped with asphalt adhesive and a layer of asbestos felt. It was used primarily in the siding and roofing of steel mill buildings. Steelmakers liked it because it was tough, resisted corrosion, and lasted for years with little or no maintenance. Demand reached a peak shortly after World War II, when the steel industry embarked on a tremendous expansion program.

In 1949, the product was declared a fire hazard by insurance companies, so producers had to alter its composition. They stopped using asphalt as an adhesive and substituted resinous plastic or molten zinc. The new product was a cold rolled or galvanized sheet topped with asbestos felt and a coating of asphaltic plastic. The felt was laminated to the steel—one side or both—under heat and pressure. After the coating was applied, the sheet was corrugated.

• **Market Weakens**—In the mid-fifties, protected metal hit the skids. Its two biggest customers sharply

reduced their purchases. First, the steel industry slowed its expansion pace and curtailed maintenance. Then the Defense Department stopped building hangars for the Strategic Air Command and started emphasizing missiles.

Instead of wringing their hands, producers set out to improve their product and broaden its markets. Sensitive to criticism from customers ("All you're offering us is that old, black, corrugated stuff. Who wants it?"), they took a page from the aluminum industry's promotional book.

• **Color Added**—"We saw that we had to cut our costs, modernize our product, and make it more attractive so that it could compete with aluminum," says Hamilton B. Bowman, executive vice president, Bowman Steel Corp., Pittsburgh. His company and its competitors—H. H. Robertson Co., Pittsburgh, and Plasteel Products Corp., Washington, Pa. — brought protected metal out in colors (red, green, buff, gray, blue, and sepia) and a variety of shapes (2½ in. corrugated, ribbed, V-beam, mansard, and fluted).

With its new beauty and time tested durability, protected metal moved into markets that it had never penetrated. Architects specified it for light and heavy commercial and industrial buildings—powerplants, warehouses, factories, office buildings, garages, bowling establishments, and shopping centers. The Atomic Energy Commission bought it to house a nuclear powerplant at Shippingport, Pa. The Defense Department used it for barracks and transmitter stations on the Dew Line and for an administration building in the Canal Zone—underscoring its suitability for exposure to extremes of cold and heat.

• **Stiff Competition**—Since protected metal costs more than painted galvanized (30 to 55 cents per square foot vs. 20 to 35 cents), sellers stress its lower upkeep. Thev claim it's cheaper in the long run because it doesn't require repainting.

Competition from aluminum isn't so tough costwise (prices are about the same as those of protected metal), but it's rugged from a promotional standpoint. Aluminum is being pushed by companies that have huge advertising budgets. Protected metal producers use the same pitch against aluminum that they use against galvanized: "Our color coating is thicker and more resistant to abrasion, corrosion, and weather."

The big difference between protected metal and its competitors is that it's an engineered product, not a commodity. Sellers have to estimate, design, cut, and erect it. Protected metal suppliers have an advantage when dealing with buyers who want to assign job responsibility to a single contractor, but they undoubtedly lose out on sales to customers who want to buy off the shelf.

• **Obstacles Aplenty** — To increase its sales, the protected metal industry must overcome these obstacles: 1. Steelmakers and other manufacturers aren't as willing as they once were to pay a higher first cost for material in return for lower maintenance. The tendency is to buy cheap, produce cheap, and let tomorrow take care of itself. 2. Some companies are accumulating capital by holding buildings for short periods, deducting depreciation from taxable profits, and selling. They couldn't care less about low maintenance costs. 3. Other firms are trying to keep fixed investments at a minimum so that they can move to other areas if labor conditions deteriorate. 4. Industrial architecture is changing. As pitched roofs give way to flat roofs, protected metal yields to ordinary roof decking.

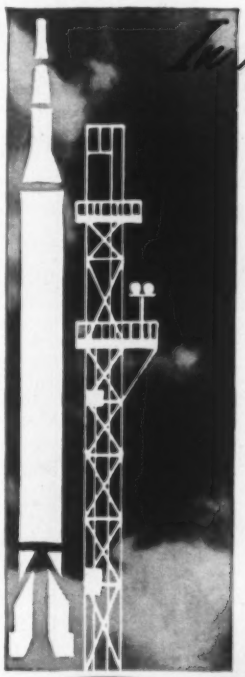
Are protected metal producers discouraged? "Not at all," says one sales executive, "but we're going to have to get out and hustle."

Sheets, Strip . . .

Sheet & Strip Prices, Pages 95 & 96

While delivery promises show little, if any, stiffening, steel buying appears to be running slightly ahead of current requirements. This is ascribed to exceedingly low inventories held by some consumers and to better business prospects for later this year.

A pickup in demand for cold rolled sheets (for automotive, metal furniture, household appliances,



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Ulbrich stocks the following Special Metals for prompt delivery of your strip requirements.

Ulbrich can supply these special metals in all tempers, all edges, in coil or cut lengths, and finish, any weight from an ounce on up, with normal delivery of two weeks. Write for complete listing of all Ulbrich metals, maximum gauges and widths.

Inconel	(3)	PH 15-7 MO	(1)
Inconel X	(3)	AM 350	
Incoloy	(3)	AM 355	
Monel	(3)	19-9 DX	
Hastelloy C	(4)	19-9 DL	
Hastelloy X	(4)	A286	
L605 (Haynes #25)	(4)	Rene 41	(2)
Carpenter 20	(5)	"A" Nickel (electronic grade)	

(1) Reg. U.S. Pat. Off. Armco Steel Corp.
(2) Reg. Trade Mark of General Electric Co.
(3) Reg. Trade Mark of Int. Nickel Co.
(4) Reg. Trade Mark of Union Carbide and Carbon Corp.
(5) Reg. Trade Mark of Carpenter Steel Co.

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and barrel and drum requirements) is noted. Although interest in hot rolled sheets is lagging, demand for galvanized sheets is well sustained, with several producers booked into October. Deliveries on enameling stock and electrical sheets range around 30 days; on hot rolled carbon sheets, two weeks.

Zinc coated steel strip up to 72 in. wide is being produced on a continuous processing line at the Middletown (Ohio) Works of Armco Steel Corp. (See STEEL, July 27, 1959, p. 101). The line, which employs a process developed by Armco, was built by Wean Engineering Co. Inc., Warren, Ohio. It has an hourly processing capacity of 30 tons.

Distributors . . .

Prices, Page 99

Some pickup in demand for steel from service centers is anticipated for August. No appreciable gain is expected, however, until after Labor Day. July business declined substantially for most service centers. One large distributor estimates his business was off 20 to 25 per cent from that of June.

In the Los Angeles area, distributors are getting inventories in balance, with wide flange structurals and alloy steel among products mentioned as still on the heavy side. Inquiry activity is healthy, notably from missile and other defense industries, alert to the international political crisis.

Steel Ingot Production Continues to Hold Steady

IMPROVEMENT in steel buying seems sufficiently adequate to assure an increase in output in August compared with July. Whether it will match or exceed June production (the second largest so far this year) remains a question. September production probably will exceed June's and may equal or surpass the May output (the year's peak to date).

Production for the week ended July 29 is estimated by STEEL at 1,860,000 tons, an increase of only 0.1 per cent compared with the previous week.

• **Youngstown** — Major mills here continued operating at about 52 per cent of 1960 capacity during the week ended July 29.

• **Buffalo** — Steel ingot production held at 44 per cent of 1960 capacity for the week ended July 29. There has been little variation in this level in recent weeks but the current influx of orders points to a gradual upturn in production in August.

• **Chicago**—Steelmaking operations were scheduled at 72 per cent of 1960 capacity for the week ended July 29, a gain of 1 point over the previous week's rate. Production is reflecting the fact that shipments of finished products in August will exceed July's by about 10 per cent.

• **Birmingham** — The steelmaking rate in this area is estimated at 64 per cent for the week ended July 29. That's a drop of around 3 points from the previous week.

• **Philadelphia**—Northeastern steel production reflects little change for the week ended July 29 from previous week when the AISI index reached 96, up 1 point.

• **Detroit** — Steel output declined during the week ended July 29. Production at McLouth Steel Corp. was down because of an unauthorized walkout over plant safety conditions. Other mills continued to operate at about the same level. One of the larger producers will cut back operations in August because automakers have overordered steel for September delivery.

• **San Francisco** — Mill schedules are holding firm with the prospect that the third quarter will be as good as the recently improved second quarter.

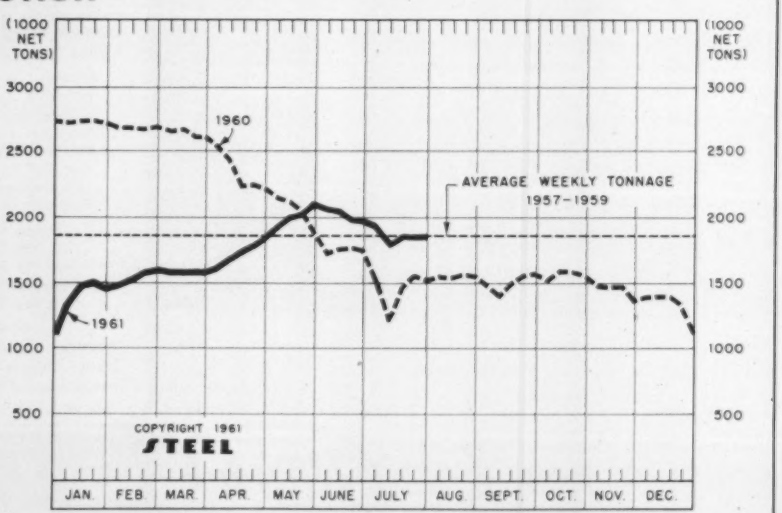
• **Cincinnati**—Steelmaking is holding steady in this area. The district's largest producer believes the seasonal decline in steel output will end in August, marking the start of an upturn to continue into the fourth quarter.

STEEL INGOT PRODUCTION

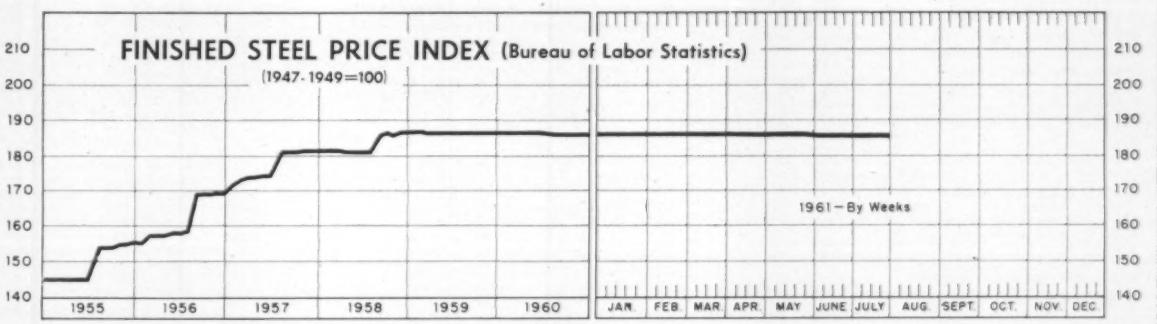
Weeks Ended	Net Tons	Change
July 29	1,860,000*	+ 0.1%
July 22	1,858,000	— 0.1%
July 15	1,860,000	+ 4.6%
Totals to July 22		
1961	50,568,000	—21.7%
1960	64,615,000	

DISTRICTS	Week Ended —July 22— Tons‡	Index†	Week Ended July 15 Index†
Northeastern	256,508	96	95
Buffalo	81,778	84	81
Pittsburgh	355,123	88	88
Youngstown	151,283	89	88
Cleveland	94,447	102	110
Detroit	122,753	117	120
Chicago	400,261	107	106
Cincinnati	88,224	117	112
St. Louis	56,229	107	104
Southern	111,648	103	112
Western	136,788	117	118
Industry	1,858,000	99.7	99.8

*Estimated by STEEL.
†1957-59 (1,862,933 tons) = 100.
‡District tonnages are approximate and will not necessarily add to the national total.



Price Indexes and Composites



July 25, 1961	Week Ago	Month Ago	July Index	Year Ago
185.6†	185.6†	185.6†	185.5†	186.2

†Based on new weighting structure.

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended July 25

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825	Bars, H.R., Carbon	6.675
Rails, Light, 40 lb	7.292	Bars, Reinforcing	(N.A.)
Tie Plates	6.875	Bars, C.F., Carbon	10.710
Axles, Railway	10.175	Bars, C.F., Alloy	14.125
Wheels, Freight Car, 33 in. (per wheel)	62.000	Bars, C.F., Stainless, 302 (lb)	0.570
Plates, Carbon	6.350	Sheets, H.R., Carbon	6.350
Structural Shapes	6.167	Sheets, C.R., Carbon	7.300
Bars, Tool Steel, Carbon (lb)	0.560	Sheets, Galvanized	8.775
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680	Sheets, C.R., Stainless, 302 (lb)	0.643
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400	Sheets, Electrical	12.625
Bars, Tool Steel, H.R. Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895	Strip, C.R., Carbon	9.225
Bars, H.R., Alloy	10.775	Strip, C.R., Stainless, 430 (lb)	0.460
Bars, H.R., Stainless, 303 (lb)	0.543	Strip, H.R., Carbon	6.250
		Pipe, Black, Buttweld (100 ft)	19.495
		Pipe, Galv., Buttweld (100 ft)	23.098
		Pipe Line (100 ft)	195.430
		Casing, Oil Well, Carbon (100 ft)	193.030
		Casing, Oil Well, Alloy (100 ft)	302.600
		Tubes, Boiler (100 ft)	51.200
		Tubing, Mechanical, Carbon (100 ft)	27.005
		Tubing, Mechanical, Stainless, 304 (100 ft)	194.268
		Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
		Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
		Black Plate, Canmaking Quality (95 lb base box)	7.900
		Wire, Drawn, Carbon	10.575
		Wire, Drawn, Stainless, 430 (lb)	0.665
		Bale Ties (Bundles)	7.647
		Nails, Wire, 8d Common	9.433
		Wire, Barbed (80-rod spool)	8.372
		Woven Wire Fence (20-rod roll)	20.910

STEEL's FINISHED STEEL PRICE INDEX

	July 26 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg = 100)	247.82	247.82	247.82	247.82	210.45
Index in cents per lb	6.713	6.713	6.713	6.713	5.701

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$131.27
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	61.09
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	60.11
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	61.63
Steelmaking Scrap, GT	37.00	37.00	37.00	31.83	47.50

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL

	July 26 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.65
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.65
Bars, H.R., deld., Philadelphia	5.98	5.98	5.98	5.975	4.93
Bars, C.R., Pittsburgh	7.65	7.65	7.65	7.65	6.25
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.60
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.60
Shapes, deld., Philadelphia	5.745	5.745	5.745	5.77	5.00
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.50
Plates, Chicago	5.30	5.30	5.30	5.30	4.50
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.80
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.50
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	5.35
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.325-5.425
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.85
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	6.25
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	6.25-6.35
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	6.35
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	6.60
Nails, Wire, nonstock, Pitts.	8.95	8.95	8.95	8.95	7.60
Tin Plate (1.50 lb)box,Pitts.	$10.65	$10.65	$10.65	$10.65	$9.85

SEMIFINISHED STEEL

Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$84.50
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	6.40	6.40	6.40	6.40	5.375

PIG IRON, Gross Ton

	July 26 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$62.25
Basic, Valley	66.00	66.00	66.00	66.00	60.00
Basic, deld., Philadelphia	70.18	70.18	70.18	70.41	66.26
No. 2 Fdry, NevilleIsland,Pa.	66.50	66.50	66.50	66.50	63.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	63.00
No. 2 Fdry, deld., Phila.	70.68	70.68	70.68	70.91	66.76
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	57.00
No. 2 Fdry(Birm.),deld.,Cin.	70.20	70.20	70.20	70.20	62.70
Malleable, Valley	66.50	66.50	66.50	66.50	60.50
Malleable, Chicago	66.50	66.50	66.50	66.50	63.00
Ferromanganese, net ton†	245.00	245.00	245.00	245.00	215.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pittsburgh	$35.50	$35.50	$36.50	$30.50	$46.50
No. 1 Heavy Melt, E. Pa.	39.00	39.00	39.00	34.00	50.00
No. 1 Heavy Melt, Chicago	36.50	36.50	35.50	31.00	46.00
No. 1 Heavy Melt, Valley	38.50	38.50	38.50	33.50	49.50
No. 1 Heavy Melt, Cleve.	35.50	35.50	35.50	31.50	45.50
No. 1 Heavy Melt, Buffalo	31.50	31.50	31.50	29.50	44.50
Rails, Rerolling, Chicago	58.50	58.50	58.50	51.50	68.50
No. 1 Cast, Chicago	41.50	41.50	41.50	40.50	45.50

COKE, Net Ton

Beehive, Furn., Connlsvl.	$15.00	$15.00	$15.00	$15.00	$14.125
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.25	16.50
Oven, Fdry., Milwaukee	32.00	32.00	32.00	32.00	27.50

Steel Prices

Mill prices as reported to STEEL, July 26, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 95; footnotes, page 97.

SEMIFINISHED

INGOTS, Carbon Forging (NT)
Munhall,Pa. U5 ..... $76.00

INGOT, Alloy (NT)
Detroit S41 ..... $82.00
Economy,Pa. B14 ..... 82.00
Farrell,Pa. S3 ..... 82.00
Lowellville,O. S3 ..... 82.00
Midland,Pa. C18 ..... 82.00
Munhall,Pa. U5 ..... 82.00
Sharon,Pa. S3 ..... 82.00

BILLETS, BLOOMS & SLABS Carbon Rolling (NT)
Bartonville,Ill. K4 ..... $82.00
Bessemer,Pa. U5 ..... 80.00
Buffalo R2 ..... 80.00
Clairton,Pa. U5 ..... 80.00
Ensley,Ala. T2 ..... 80.00
Fairfield,Ala. T2 ..... 80.00
Fontana,Calif. K1 ..... 90.50
Gary,Ind. U5 ..... 80.00
Johnstown,Pa. B2 ..... 80.00
Lackawanna,N.Y. B2 ..... 80.00
Munhall,Pa. U5 ..... 80.00
Owensboro,Ky. G8 ..... 80.00
S.Chicago,Ill. R2, U5 ..... 80.00
S.Duquesne,Pa. U5 ..... 80.00
Sterling,Ill. N15 ..... 80.00
Youngstown R2 ..... 80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ..... $99.50
Buffalo R2 ..... 99.50
Canton,O. R2 ..... 102.00
Clairton,Pa. U5 ..... 99.50
Conshohocken,Pa. A3 ..... 99.50
Ensley,Ala. T2 ..... 99.50
Fairfield,Ala. T2 ..... 99.50
Farrell,Pa. S3 ..... 99.50
Fontana,Calif. K1 ..... 109.00
Gary,Ind. U5 ..... 99.50
Geneva,Utah C11 ..... 99.50
Houston S5 ..... 104.50
Johnstown,Pa. B2 ..... 99.50
Lackawanna,N.Y. B2 ..... 99.50
LosAngeles B3 ..... 109.00
Midland,Pa. C18 ..... 99.50
Munhall,Pa. U5 ..... 99.50
Owensboro,Ky. C8 ..... 99.50
Seattle B3 ..... 109.00
Sharon,Pa. S3 ..... 99.50
S.Chicago R2, U5, W14 ..... 99.50
S.Duquesne,Pa. U5 ..... 99.50
S.San Francisco B3 ..... 109.00
Warren,O. C17 ..... 99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ..... $119.00
Bridgeport,Conn. C32 ..... 119.00
Buffalo R2 ..... 119.00
Canton,O. R2, T7 ..... 119.00
Conshohocken,Pa. A3 ..... 121.00
Detroit S41 ..... 119.00
Economy,Pa. B14 ..... 119.00
Farrell,Pa. S3 ..... 119.00
Fontana,Calif. K1 ..... 140.00
Gary,Ind. U5 ..... 119.00
Houston S5 ..... 124.00
Ind.Harbor,Ind. Y1 ..... 119.00
Johnstown,Pa. B2 ..... 119.00
Lackawanna,N.Y. B2 ..... 119.00
LosAngeles B3 ..... 139.00
Lowellville,O. S3 ..... 119.00
Massillon,O. R2 ..... 119.00
Midland,Pa. C18 ..... 119.00
Munhall,Pa. U5 ..... 119.00
Owensboro,Ky. G8 ..... 119.00
Seattle(6) B3 ..... 140.00
Sharon,Pa. S3 ..... 119.00
S.Chicago R2,U5,W14 ..... 119.00
S.Duquesne,Pa. U5 ..... 119.00
Struthers,O. Y1 ..... 119.00
Warren,O. C17 ..... 119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 ..... $122.50
Canton,O. R2 ..... 125.00
Cleveland R2 ..... 122.50
Gary,Ind. U5 ..... 122.50
S.Chicago,Ill. R2,W14 ..... 122.50
S.Duquesne,Pa. U5 ..... 122.50
Warren,O. C17 ..... 122.50

SKELP
Aliquippa,Pa. J5 ..... 5.05
Benwood,W.Va. W10 ..... 5.05
Ind.Harbor,Ind. Y1 ..... 5.05
Munhall,Pa. P5 ..... 5.05
Pittsburgh J5 ..... 5.05
Warren,O. R2 ..... 5.05
Youngstown R2, U5 ..... 5.05

WIRE RODS
AlabamaCity,Ala. R2 ..... 6.40
Aliquippa,Pa. J5 ..... 6.40
Alton,Ill. L1 ..... 6.60
Bartonville,Ill. K4 ..... 6.50
Buffalo W12 ..... 6.40
Cleveland A7 ..... 6.40
Donora,Pa. A7 ..... 6.40
Fairfield,Ala. T2 ..... 6.40
Houston S5 ..... 6.65
IndianaHarbor,Ind. Y1 ..... 6.40
Johnstown,Pa. B2 ..... 6.40
Joliet,Ill. A7 ..... 6.40
KansasCity,Mo. S5 ..... 6.65
Kokomo,Ind. C16 ..... 6.50
LosAngeles B3 ..... 7.20
Minnequa,Colo. C10 ..... 6.65
Monessen,Pa. P7 ..... 6.40
Pittsburg,Calif. C11 ..... 7.20
Portsmouth,O. P12 ..... 6.40
Roebling,N.J. R5 ..... 6.50
S.Chicago,Ill. R2, W14 ..... 6.40
SparrowsPoint,Md. B2 ..... 6.50
Sterling,Ill.(1) N15 ..... 6.40
Sterling,Ill. N15 ..... 6.50
Struthers,O. Y1 ..... 6.40
Worcester,Mass. A7 ..... 6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ..... 5.50
Aliquippa,Pa. J5 ..... 5.50
Atlanta A11 ..... 5.70
Bessemer,Ala. T2 ..... 5.50
Bethlehem,Pa. B2 ..... 5.55
Birmingham C15 ..... 5.50
Clairton,Pa. U5 ..... 5.50
Fairfield,Ala. T2 ..... 5.50
Fontana,Calif. K1 ..... 6.30
Gary,Ind. U5 ..... 5.50
Geneva,Utah C11 ..... 5.50
Houston S5 ..... 5.60
Ind.Harbor,Ind. I-2, Y1 ..... 5.50
Johnstown,Pa. B2 ..... 5.55
Joliet,Ill. P22 ..... 5.50
KansasCity,Mo. S5 ..... 5.60
Lackawanna,N.Y. B2 ..... 5.55
LosAngeles B3 ..... 6.20
Minnequa,Colo. C10 ..... 5.80
Munhall,Pa. U5 ..... 5.50
Niles,Calif. P1 ..... 6.25
Phoenixville,Pa. P4 ..... 5.55
Portland,Oreg. O4 ..... 6.25
Seattle B3 ..... 6.25
S.Chicago,Ill. U5, W14 ..... 5.50
S.SanFrancisco B3 ..... 6.15
Sterling,Ill. N15 ..... 5.50
Struthers,O. Y1 ..... 5.50
Torrance,Calif. C11 ..... 6.20
Weirton,W. Va. W6 ..... 5.50

Wide Flange
Bethlehem,Pa. B2 ..... 5.55
Clairton,Pa. U5 ..... 5.50
Fontana,Calif. K1 ..... 6.45
IndianaHarbor,Ind. I-2 ..... 5.50
Lackawanna,N.Y. B2 ..... 5.55
Munhall,Pa. U5 ..... 5.50
Phoenixville,Pa. P4 ..... 5.55
S.Chicago,Ill. U5 ..... 5.50
Sterling,Ill. N5 ..... 5.50
Weirton,W.Va. W6 ..... 5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 ..... 6.80
Clairton,Pa. U5 ..... 6.80
Gary,Ind. U5 ..... 6.80
Houston S5 ..... 6.90
Munhall,Pa. U5 ..... 6.80
S.Chicago,Ill. U5, W14 ..... 6.80

H.S., L.A., Std. Shapes
Aliquippa,Pa. J5 ..... 8.05
Bessemer,Ala. T2 ..... 8.05
Bethlehem,Pa. B2 ..... 8.10
Clairton,Pa. U5 ..... 8.05
Fairfield,Ala. T2 ..... 8.05
Fontana,Calif. K1 ..... 8.85
Gary,Ind. U5 ..... 8.05
Geneva,Utah C11 ..... 8.05
Houston S5 ..... 8.15
Ind.Harbor,Ind. I-2, Y1 ..... 8.05
Johnstown,Pa. B2 ..... 8.10
KansasCity,Mo. S5 ..... 8.15
Lackawanna,N.Y. B2 ..... 8.10
LosAngeles B3 ..... 8.75
Munhall,Pa. U5 ..... 8.05
Phoenixville,Pa. P4 ..... 8.10
Seattle B3 ..... 8.80
S.Chicago,Ill. U5, W14 ..... 8.05
S.SanFrancisco B3 ..... 8.70
Sterling,Ill. N15 ..... 7.75
Struthers,O. Y1 ..... 8.05

H.S., L.A., Wide Flange
Bethlehem,Pa. B2 ..... 8.10
Ind.Harbor,Ind. I-2 ..... 8.05
Lackawanna,N.Y. B2 ..... 8.10
Munhall,Pa. U5 ..... 8.05
S.Chicago,Ill. U5 ..... 8.05
Sterling,Ill. N15 ..... 7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 ..... 5.55
Ind.Harbor,Ind. I-2 ..... 5.50
Lackawanna,N.Y. B2 ..... 5.55
Munhall,Pa. U5 ..... 5.50
S.Chicago,Ill. I-2, U5 ..... 5.50

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ..... 6.50
Lackawanna,N.Y. B2 ..... 6.50
Munhall,Pa. U5 ..... 6.50
S.Chicago,Ill. I-2, U5 ..... 6.50
Weirton,W.Va. W6 ..... 6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..... 5.30
Aliquippa,Pa. J5 ..... 5.30
Ashland,Ky.(15) A10 ..... 5.30
Bessemer,Ala. T2 ..... 5.30
Clairton,Pa. U5 ..... 5.30
Claymont,Del. P4 ..... 5.30
Cleveland J5, R2 ..... 5.30
Coatesville,Pa. L7 ..... 5.30
Conshohocken,Pa. A3 ..... 5.30
Ecorse,Mich. G5 ..... 5.30
Fairfield,Ala. T2 ..... 5.30
Farrell,Pa. S3 ..... 5.30
Fontana,Calif.(30) K1 ..... 6.10
Gary,Ind. U5 ..... 5.30
Geneva,Utah C11 ..... 5.30
GraniteCity,Ill. G4 ..... 5.40
Houston S5 ..... 5.40
Ind.Harbor,Ind. I-2, Y1 ..... 5.30
Johnstown,Pa. B2 ..... 5.30
Lackawanna,N.Y. B2 ..... 5.30
Mansfield,O. E6 ..... 5.30
Minnequa,Colo. C10 ..... 6.15
Munhall,Pa. U5 ..... 5.30
Newport,Ky. A2 ..... 5.30
Pittsburgh J5 ..... 5.30
Riverdale,Ill. A1 ..... 5.30
Seattle B2 ..... 6.20
Sharon,Pa., S3 ..... 5.30
S.Chicago,Ill. U5, W14 ..... 5.30
SparrowsPoint,Md. B2 ..... 5.30
Sterling,Ill. N15 ..... 5.30
Steubenville,O. W10 ..... 5.30
Warren,O. R2 ..... 5.30
Youngstown U5, Y1 ..... 5.30
Youngstown(27) R2 ..... 5.30

PLATES, Carbon Abras. Resist.
Claymont,Del. P4 ..... 7.05
Fontana,Calif. K1 ..... 7.85
Geneva,Utah C11 ..... 7.05
Houston S5 ..... 7.15
Johnstown,Pa. B2 ..... 7.05
SparrowsPoint,Md. B2 ..... 7.05

PLATES, Wrought Iron
Economy,Pa. B14 ..... 14.10

PLATES, H.S., L.A.
Aliquippa,Pa. J5 ..... 7.95
Ashland,Ky. A10 ..... 7.95
Bessemer,Ala. T2 ..... 7.95
Clairton,Pa. U5 ..... 7.95
Claymont,Del. P4 ..... 7.95
Cleveland J5, R2 ..... 7.95
Coatesville,Pa. L7 ..... 7.95
Conshohocken,Pa. A3 ..... 7.95
Economy,Pa. B14 ..... 7.95
Ecorse,Mich. G5 ..... 7.95
Fairfield,Ala. T2 ..... 7.95
Farrell,Pa. S3 ..... 7.95
Fontana,Calif.(30) K1 ..... 8.75
Gary,Ind. U5 ..... 7.95
Geneva,Utah C11 ..... 7.95
Houston S5 ..... 8.05
Ind.Harbor,Ind. I-2, Y1 ..... 7.95
Johnstown,Pa. B2 ..... 7.95
Munhall,Pa. U5 ..... 7.95
Pittsburgh J5 ..... 7.95
Seattle B3 ..... 8.85
Sharon,Pa. S3 ..... 7.95
S.Chicago,Ill. U5, W14 ..... 7.95
SparrowsPoint,Md. B2 ..... 7.95
Sterling,Ill. N15 ..... 7.625
Warren,O. R2 ..... 7.95
Youngstown U5, Y1 ..... 7.95

PLATES, Alloy
Aliquippa,Pa. J5 ..... 7.50
Claymont,Del. P4 ..... 7.50
Coatesville,Pa. L7 ..... 7.50
Economy,Pa. B14 ..... 7.50
Farrell,Pa. S3 ..... 7.50
Fontana,Calif. K1 ..... 8.30
Gary,Ind. U5 ..... 7.50
Houston S5 ..... 7.60
Ind.Harbor,Ind. Y1 ..... 7.50
Johnstown,Pa. B2 ..... 7.50
Lowellville,O. S3 ..... 7.50
Munhall,Pa. U5 ..... 7.50
Newport,Ky. A2 ..... 7.50
Pittsburgh J5 ..... 7.50
Seattle B3 ..... 8.40
Sharon,Pa. S3 ..... 7.50
S.Chicago,Ill. U5, W14 ..... 7.50
SparrowsPoint,Md. B2 ..... 7.50
Youngstown Y1 ..... 7.50

PLATES, Ingot Iron
Ashland c.l.(15) A10 ..... 5.55
Ashland l.c.l.(15) A10 ..... 6.05
Cleveland c.l. R22 ..... 6.05
Warren,O. R2 ..... 6.05

FLOOR PLATES
Cleveland J5 ..... 6.375
Claymont,Del. P4 ..... 6.375
Conshohocken,Pa. A3 ..... 6.375
Ind.Harbor,Ind. I-2 ..... 6.375
Munhall,Pa. U5 ..... 6.375
Pittsburgh J5 ..... 6.375
S.Chicago,Ill. U5 ..... 6.375

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ..... 5.675
Aliquippa,Pa.(9) J5 ..... 5.675
Alton,Ill. L1 ..... 5.875
Atlanta(9) A11 ..... 5.875
Bessemer,Ala.(9) T2 ..... 5.675
Birmingham(9) C15 ..... 5.675
Buffalo(9) R2 ..... 5.675
Canton,O.(23) R2 ..... 6.15
Clairton,Pa.(9) U5 ..... 5.675
Cleveland(9) R2 ..... 5.675
Ecorse,Mich.(9) G5 ..... 5.675
Emeryville,Calif. J7 ..... 6.425
Fairfield,Ala.(9) T2 ..... 5.675
Fairless,Pa.(9) U5 ..... 5.825
Fontana,Calif.(9) K1 ..... 6.375
Gary,Ind.(9) U5 ..... 5.675
Houston(9) S5 ..... 5.925
Ind.Harbor(9) I-2, Y1 ..... 5.675
Johnstown,Pa.(9) B2 ..... 5.675
Joliet,Ill. P2 ..... 5.675
KansasCity,Mo.(9) S5 ..... 5.925
Lackawanna(9) B2 ..... 5.675
LosAngeles(9) B3 ..... 6.375
Massillon,O.(23) R2 ..... 6.15
Midland,Pa.(23) C18 ..... 6.025
Milton,Pa. M18 ..... 5.825
Minnequa,Colo. C10 ..... 6.125
Niles,Calif. P1 ..... 6.375
Owensboro,Ky.(9) G8 ..... 6.025
Pittsburg,Calif.(9) C11 ..... 6.375
Pittsburgh(9) J5 ..... 5.675
Portland,Oreg.O4 ..... 6.425
Riverdale,Ill.(9) A1 ..... 5.675
Seattle(9) A24,B3,N15 ..... 6.425
S.Ch'c'go(9)R2,U5,W14 ..... 5.675
S.Duquesne,Pa.(9) U5 ..... 5.675
S.SanFran.,Calif.(9) B3 ..... 6.425
Sterling,Ill.(1)(9) N15 ..... 5.675
Sterling,Ill.(9) N15 ..... 5.775
Struthers,O.(9) Y1 ..... 5.675
Tonawanda,N.Y. B12 ..... 5.675
Torrance,Calif.(9) C11 ..... 6.375
Warren,O. C17 ..... 6.025
Youngstown(9) R2, U5 ..... 5.675

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 ..... 6.725
Bethlehem,Pa. B2 ..... 6.725
Bridgeport,Conn. C32 ..... 6.80
Buffalo R2 ..... 6.725
Canton,O. R2, T7 ..... 6.725
Clairton,Pa. U5 ..... 6.725
Detroit S41 ..... 6.725
Economy,Pa. B14 ..... 6.725
Ecorse,Mich. G5 ..... 6.725
Farrell,Pa. S3 ..... 6.725
Fontana,Calif. K1 ..... 7.775
Gary,Ind. U5 ..... 6.725
Houston S5 ..... 6.975
Ind.Harbor,Ind. I-2, Y1 ..... 6.725
Johnstown,Pa. B2 ..... 6.725
KansasCity,Mo. S5 ..... 6.975
Lackawanna,N.Y. B2 ..... 6.725
LosAngeles B3 ..... 7.775
Lowellville,O. S3 ..... 6.725
Massillon,O. R2 ..... 6.725
Midland,Pa. C18 ..... 6.725
Owensboro,Ky. G8 ..... 6.725
Pittsburgh J5 ..... 6.725
Seattle(6) B3 ..... 7.825
Sharon,Pa. S3 ..... 6.725
S.Chicago R2, U5, W14 ..... 6.725
S.Duquesne,Pa. U5 ..... 6.725
Struthers,O. Y1 ..... 6.725
Warren,O. C17 ..... 6.725
Youngstown U5 ..... 6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 ..... 8.30
Bessemer,Ala. T2 ..... 8.30
Bethlehem,Pa. B2 ..... 8.30
Clairton,Pa. U5 ..... 8.30
Cleveland R2 ..... 8.30
Ecorse,Mich. G5 ..... 8.30
Fairfield,Ala. T2 ..... 8.30
Fontana,Calif. K1 ..... 9.00
Gary,Ind. U5 ..... 8.30
Houston S5 ..... 8.55
Ind.Harbor,Ind. Y1 ..... 8.30
Johnstown,Pa. B2 ..... 8.30
KansasCity,Mo. S5 ..... 8.55
Lackawanna,N.Y. B2 ..... 8.30
LosAngeles B3 ..... 9.00
Pittsburgh J5 ..... 8.30
Seattle B3 ..... 9.05
S.Chicago,Ill. R2, W14 ..... 8.30
S.Duquesne,Pa. U5 ..... 8.30
S.SanFrancisco B3 ..... 9.05
Sterling,Ill. N15 ..... 7.925
Struthers,O. Y1 ..... 8.30
Youngstown U5 ..... 8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..... 5.825
Houston(9) S5 ..... 5.925
KansasCity,Mo.(9) S5 ..... 5.925
Lackawanna(9) B2 ..... 5.675
Sterling,Ill. N15 ..... 5.775
Sterling,Ill.(1) N15 ..... 5.675
Tonawanda,N.Y. B12 ..... 5.675

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 ..... 5.675
Atlanta A11 ..... 5.875
Joliet,Ill. P22 ..... 5.675
Minnequa,Colo. C10 ..... 6.125
Niles,Calif. P1 ..... 6.375
Pittsburgh J5 ..... 5.675
Portland,Oreg. O4 ..... 6.425
SanFrancisco S7 ..... 6.52
Seattle B3 ..... 6.425

BAR SIZE ANGLES; S. SHAPES Wrought Iron
Economy,Pa. B14 ..... 16.45

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 ..... 6.80
Clairton,Pa. U5 ..... 6.80
Gary,Ind. U5 ..... 6.80
Houston S5 ..... 7.05
KansasCity,Mo. S5 ..... 7.05
Pittsburgh J5 ..... 6.80
Youngstown U5 ..... 6.80

BARS, C.F. Loaded (Including leaded extra) Carbon
LosAngeles P2, S30 ... 11.75*

Alloy
Ambridge,Pa. W18 ... 10.175
BeaverFalls,Pa. M12 ... 10.175
Camden,N.J. P13 ..... 10.35
Chicago W18 ..... 10.175
Elyria,O. W8 ..... 10.175
Monaca,Pa. S17 ..... 10.175
Newark,N.J. W18 .... 10.35
SpringCity,Pa. K3 .... 10.35

*Grade A; add 0.5c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ..... 7.65
BeaverFalls,Pa. M12,R2 7.65
Birmingham C15 ..... 8.25
Buffalo B5 ..... 7.70
Camden,N.J. P13 ..... 8.10
Carnegie,Pa. C12 ..... 7.65
Chicago W18 ..... 7.65
Cleveland A7, C20 ..... 7.65
Detroit B5, H5, P17 ..... 7.85
Detroit S41 ..... 7.65
Donora,Pa. A7 ..... 7.65
Elyria,O. W8 ..... 7.65
FranklinPark,Ill. N5 ..... 7.65
Gary,Ind. R2 ..... 7.65
GreenBay,Wis. F7 ..... 7.65
Hammond,Ind. J5, L2 ..... 7.65
Hartford,Conn. R2 ..... 8.15
Harvey,Ill. B5 ..... 7.65
LosAngeles(49) S30 ..... 9.10
LosAngeles(49) P2, R2 .. 9.10
Mansfield,Mass. B5 ..... 8.20
Massillon,O. R2, R8 ..... 7.65
Midland,Pa. C18 ..... 7.65
Monaca,Pa. S17 ..... 7.65
Newark,N.J. W18 ..... 8.10
NewCastle,Pa.(17) B4 ..... 7.65
Pittsburgh J5 ..... 7.65
Plymouth,Mich. P5 ..... 7.90
Putnam,Conn. W18 ..... 8.20
Readville,Mass. C14 ..... 8.20
Seattle(49) S30 ..... 9.10
S.Chicago,Ill. W14 ..... 7.65
SpringCity,Pa. K3 ..... 8.10
Struthers,O. Y1 ..... 7.65
Warren,O. C17 ..... 7.65
Waukegan,Ill. A7 ..... 7.65
Willimantic,Conn. J5 ..... 8.15
Youngstown F3, Y1 ..... 7.65

BARS, Cold-Finished Alloy (Turned and Ground)
Cumberland,Md.(5) C19 6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ..... 9.025
BeaverFalls,Pa. M12,R2 9.025
Bethlehem,Pa. B2 ..... 9.025
Bridgeport,Conn. C32 .. 9.175
Buffalo B5 ..... 9.025
Camden,N.J. P13 ..... 9.20
Canton,O. T7 ..... 9.025
Carnegie,Pa. C12 ..... 9.025
Chicago W18 ..... 9.025
Cleveland A7, C20 ..... 9.25
Detroit B5, P17 ..... 9.225
Detroit H5, S41 ..... 9.025
Donora,Pa. A7 ..... 9.025
Elyria,O. W8 ..... 9.025
FranklinPark,Ill. N5 ..... 9.025
Gary,Ind. R2 ..... 9.025
GreenBay,Wis. F7 ..... 9.025

Hammond,Ind. J5, L2..9.025
Hartford,Conn. R2 ....9.325
Harvey,Ill. R5 .....9.025
Lackawanna,N.Y. B3 ..9.025
LosAngeles P2, S30 ...11.00
Mansfield,Mass. B5 ...9.325
Massillon,O. R2, R8 ...9.025
Midland,Pa. C18 .....9.025
Monaca,Pa. S17 .....9.025
Newark,N.J. W18 .....9.20
Plymouth,Mich. P5 ...9.225
S.Chicago,Ill. W14 ....9.025
SpringCity,Pa. K3 .....9.20
Struthers,O. Y1 .....9.025
Warren,O. C17 .....9.025
Waukegan,Ill. A7 ....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ...9.325
Youngstown F3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

Atlanta A11 .....5.00
Birmingham C15 .....5.25
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ..6.425
Fontana,Calif. K1 ...6.375
Ind.Harbor,Ind. Y1 ....5.675
Johnstown,Pa. B2 ....5.675
Joliet,Ill. P22 .....5.675
Kokomo,Ind. C16 .....5.775
Lackawanna,N.Y. B2 ..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.475
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ..6.125
Niles,Calif. P1 .....6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
Seattle A24, B3, N14 ..6.425
S.Chicago,Ill. W14 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2 .5.675
Steelton,Pa. B2 .....5.675
Sterling,Ill. (1) N15 ..5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ..6.10

BARS, Reinforcing, Billet (Fabricated, to Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Johnstown,Pa. B2 .....7.33
Lackawanna,N.Y. B2 ..7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
Seattle A24, B3, N14 ..7.95
SparrowsPoint,Md. B2 ..7.33
St.Paul U8 .....8.17

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 16.10
Economy,Pa.(D.R.)B14 20.50
Econ.(DirectRolled)B14 13.55
Economy(Staybolt) B14 20.50
McK.Rks.(S.R.) L5 ...16.10
McK.Rks.(D.R.) L5 ...20.50
McK.Rks.(DirRolled)L5 13.55

BARS, Rail Steel

ChicagoHts.(3) C2, I-2 5.575
ChicagoHts.(4)(44) I-2 5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa.(3) F5 ...5.575
Franklin,Pa.(4) F5 ...5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O.(3) P11 ....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1 5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 ....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14..5.10
SparrowsPoint,Md. B2 .5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 .....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 .....6.275

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ..7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14 7.525
Sharon,Pa. S3 .....7.525
SparowsPoint(36) B2 .7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ...7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ....5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.06
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.06

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ..7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2 .6.275
Steubenville,O. W10 ....6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 .....6.275
Yorkville,O. W10 .....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(38) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(33) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert

	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.125	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	....7.125	....
Fairfield,Ala. T2	7.125	7.375
Gary,Ind. U5	....7.125	7.375
GraniteCity,Ill.G4	7.225	....
Ind.Harbor I-2	.7.225	7.425
Irvin,Pa. U5	....7.125	7.375
Kokomo,Ind. C16	.7.325	....
MartinsFry. W10	.7.125	7.375
Pitts.,Calif. C11	.7.875	....
Pittsburgh J5	...7.125	....
SparrowsPt. B2	.7.225	....
Weirton W6	....7.125	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....7.475

SHEETS, Enameling

Ashland,Ky A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 ....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
SparrowsPoint,Md. B2..6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel

Follansbee,W.Va. W10 7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1) 9.525

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325
Geneva,Utah C11 .....6.80

SHEETS, Galvanized High-Strength, Low Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.175
Irvin,Pa. U5 .....7.175

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Canfield,O. C3 .....7.50
Cleveland (28) R2 ....7.65
Niles,O. (28) R2 .....7.65
Weirton,W.Va. W6 .....7.50

SHEETS, Galvanized Steel Hot-Dipped§

AlabamaCity,Ala. R2 .6.875‡
Ashland,Ky. A10 ....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ..6.975*
Ind.Harb.,Ind. I-2, Y1 6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 ....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ..6.875†
Pittsburg,Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ...6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous. §For minimum spangled add 0.15c.

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A25 Algoma Steel Corp. Ltd.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C3 Canfield Steel Co.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire Div., Hoover Ball & Bearing
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E2 Eastern Stainless Steel
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimons Steel Co.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H5 Hercules Drawn Steel
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.
J10 Jay Steel Corp.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.
M23 Mill Strip Products Co. of Pennsylvania

N1 National Standard Co.
N2 National Supply, Armco Steel Corp.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N17 National Steel Corp.
N20 Neville Ferro Alloy Co.

O1 Ohio Ferro-Alloys Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P25 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 RelianceDiv.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div. Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw&Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S37 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Div., Bliss & Laughlin Inc.
S31 Sawhill Tubular Products
S40 Seneca Steel Service
S41 Stainless & Strip Div., J & L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America
S45 Somers Brass Co.
S46 Steel Co. of Canada
S47 Seaway Steel Corp.

T2 Tenn. Coal & Iron Div. U. S. Steel Corp.
T3 Tenn. Products & Chemical
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope, Armco Steel Corp.
U4 Universal-Cyclops Steel
U5 U. S. Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloy Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Div., National Steel Corp.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ..5.10
Allenport,Pa. P7 .....5.10
Alton,Ill. L1 .....5.30
Ashland,Ky.(8) A10 ...5.10
Atlanta A11 .....5.10
Bessemer,Ala. T2 .....5.10
Birmingham C15 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Farrell,Pa. S3 .....5.10
Funtana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Ind.Harbor,Ind. I-2, Y1.5.10
Johnstown,Pa.(25) B2 ..5.10
Lackaw'na,N.Y.(25) B2.5.10
LosAngeles(25) B3 ....5.85
LosAngeles C1 .....8.60
Minnequa,Colo. C10 ....6.20
Riverdale,Ill. A1 .....5.10
SanFrancisco S7 .....6.60
Seattle(25) B3 .....6.10
Seattle N14 .....6.60
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. W14 ....5.10
S.SanFrancisco(25) B3 ..5.85
SparrowsPoint,Md. B2 ..5.10
Torrance,Calif. C11 ...5.85
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ...5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18 .....8.40
Farrell,Pa. S3 .....8.40
Gary,Ind. U5 .....8.40
Houston S5 .....8.65
Ind.Harbor,Ind. Y1 ....8.40
KansasCity,Mo. S5 .....8.65
LosAngeles B3 .....9.60
Lowellville,O. S3 .....8.40
Newport,Ky. A2 .....8.40
Sharon,Pa. A2, S3 .....8.40
S.Chicago,Ill. W14 ....8.40
Youngstown U5, Y1 ...8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10 ....7.575
Bessemer,Ala. T2 .....7.575
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.575
Fairfield,Ala. T2 .....7.575
Farrell,Pa. S3 .....7.575
Gary,Ind. U5 .....7.575
Ind.Harbor,Ind. I-2, Y1.7.575
Lackawanna,N.Y. B2 ..7.575
LosAngeles(25) B3 ....8.325
Seattle(25) B3 .....8.575
Sharon,Pa. S3 .....7.575
S.Chicago,Ill. W14 ....7.575
S.SanFrancisco(25) B3.8.325
SparrowsPoint,Md. B2 .7.575
Warren,O. R2 .....7.575
Weirton,W.Va. W6 ....7.575
Youngstown U5, Y1 ...7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ...5.35
Warren,O. R2 .....5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 ....7.425
Baltimore T6 .....7.425
Boston T6 .....7.975
Buffalo S40 .....7.425
Cleveland A7 .....7.425
Dearborn,Mich. S3 ....7.425
Detroit D2, M1, P20 ..7.425
Dover,O. G6 .....7.425
Evanston,Ill. M22 ....7.425
Farrell,Pa. S3 .....7.425
Follansbee,W.Va. W10 .7.425
Fontana,Calif. K1 ....9.20
FranklinPark,Ill. T6 ...7.425
Ind.Harbor,Ind. Y1 ...7.425
Indianapolis S41 .....7.575
LosAngeles C1, S41 ....9.30
McKeesport,Pa. E10 ...7.525
NewBedford,Mass. R10.7.875
NewBritain,Conn. S15 .7.875
NewCastle,Pa. B4, M23.7.425
NewHaven,Conn. D2 ...7.875
NewKensington,Pa. A6.7.425
Pawtucket,R.I. R3, N8.7.975
Philadelphia P24 .....7.875
Riverdale,Ill. A1 .....7.425
Rome,N.Y.(32) R6 ....7.425
Sharon,Pa. S3 .....7.425
Trenton,N.J.(31) R5 ...8.875
Warren,O. R2, T5 ....7.425
Worcester,Mass. A7 ...7.975
Youngstown Y1 .....7.425
Youngstown S41 .....7.425

STRIP, Cold-Rolled Alloy

Boston T6 .....15.90
Carnegie,Pa. S18 .....15.55
Cleveland A7 .....15.55
Dover,O. G6 .....15.55
Farrell,Pa. S3 .....15.55
FranklinPark,Ill. T6 ..15.55
Harrison,N.J. S18 .....15.55
Indianapolis S41 .....15.70
LosAngeles S41 .....17.75
Lowellville,O. S3 .....15.55
Pawtucket,R.I. S8 ....15.90
Riverdale,Ill. A1 .....15.55
Sharon,Pa. S3 .....15.55
Worcester,Mass. A7 ...15.85
Youngstown S41 .....15.55

STRIP, Cold-Rolled High Strength, Low-Alloy

Cleveland A7 .....10.80
Dearborn,Mich. S3 ....10.80
Dover,O. G6 .....10.80
Farrell,Pa. S3 .....10.80
Ind.Harbor,Ind. Y1 ....10.80
Sharon,Pa. S3 .....10.80
Warren,O. R2 .....10.80
Weirton,W.Va. W6 ....10.80
Youngstown Y1 .....10.80

STRIP, Galvanized (Continuous)

Farrell,Pa. S3 .....7.50
Sharon,Pa. S3 .....7.50

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Anderson,Ind. G6	9.10	....	....	....	....
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	9.05	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, M23	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
New York W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	18.85	22.95	27.80
Buffalo W12	18.85	....	....
Fostoria,O. S1	19.05	22.15	....
FranklinPark,Ill. T6	19.20	23.30	28.15
Harrison,N.J. C18	18.85	22.95	27.80
NewYork W3	18.85	22.95	27.80
Palmer,Mass. W12	18.85	....	....
Trenton,N.J. R5	18.85	22.95	27.80
Worcester,Mass. A7, T6	18.85	22.95	27.80
Youngstown S41	19.20	23.30	28.15

STRIP, C.R., Electrogalvanized

Cleveland A7 .....7.425*
Dover,O. G6 .....7.425*
Evanston,Ill. M22 ....7.525*
McKeesport,Pa. E10 ..7.50*
NewCastle,Pa. M23 ..7.425*
Riverdale,Ill. A1 ....7.525*
Warren,O. B9, S3, T5.7.425*
Worcester,Mass. A7 ...7.975
Youngstown S41 .....7.425*

*Plus galvanizing extras.

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....8.175

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.825
Farrell,Pa. S3 .....5.525
Riverdale,Ill. A1 .....5.675
Sharon,Pa. S3 .....5.525
Youngstown U5 .....5.525

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.10	9.35	9.75
Fairless,Pa. U5	9.10	9.35	9.75
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.85
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irvin,Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9.35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Weirton,W.Va. W6	9.10	9.35	9.75
Yorkville,O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)			
Aliquippa,Pa. J5 (21-27 Ga.)	7.90	8.10	....
IndianaHarbor,Ind. Y1 (20-27 Ga.)	7.90	....	....
Niles,O. R2 (20-27 Ga.)	7.90	8.10	8.30

ELECTROLYTIC THIN TIN PLATE (¼ lb coating in coils)

	Base Box			
	45 lb	50 lb	55 lb	60 lb
Fairfield,Ala. T2	$6.10	$6.25	$6.40	$6.55
Fairless,Pa. U5	6.10	6.25	6.40	6.55
Gary,Ind. U5	6.10	6.25	6.40	6.55
IndianaHarbor,Ind. I-2	6.10	6.25	6.40	6.55
Irvin,Pa. U5	6.10	6.25	6.40	6.55
SparrowsPoint,Md. B2	6.10	6.25	6.40	6.55
Weirton,W.Va. W6	6.10	6.25	6.40	6.55

Tin Plate,Hot Dipped Common Coke	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.40	10.65
Fairless,Pa. U5	10.40	10.65
Fontana,Calif. K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Irvin,Pa. U5	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va. W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5 .....$8.20
Fairfield,Ala. T2 .....8.20
Fairless,Pa. U5 .....8.20
Fontana,Calif. K1 ....8.85
Gary,Ind. U5 .....8.20
GraniteCity,Ill. G4 ....8.30
Ind.Harbor,Ind. Y1 ....8.20
Irvin,Pa. U5 .....8.20
Niles,O. R2 .....8.20
Pittsburg,Calif. C11 ...8.85
SparrowsPoint,Md. B2 ..8.20
Weirton,W.Va. W6 ....8.20
Yorkville,O. W10 .....8.20

HOLLOWARE ENAMELING (Black Plate) (29 Gage)

Aliquippa,Pa. J5 .....7.85
Gary,Ind. U5 .....7.85
GraniteCity,Ill. G4 ....7.95
Ind.Harbor,Ind. Y1 ....7.85
Irvin,Pa. U5 .....7.85
Yorkville,O. W10 .....7.85

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	9.875*	11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles,O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren,O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Mansfield,O. E6	8.10
Vandergrift,Pa. U5	8.10
Warren,O. R2 (Locore)	8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	....	19.70	20.20	20.70	....
Vandergrift,Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coil annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ...8.00
Aliquippa,Pa. J5 .....8.00
Alton,Ill. L1 .....8.20
Atlanta A1 .....8.00
Bartonville,Ill. K4 .....8.10
Buffalo W12 .....8.00
Chicago W13 .....8.00
Cleveland A7, C20 ....8.00
Crawfordsville,Ind. MS..8.10
Donora,Pa. A7 .....8.00
Duluth A7 .....8.00
Fairfield,Ala. T2 .....8.00
Fostoria,O.(24) S1 .....8.10
Houston S5 .....8.25
Jacksonville,Fla. MS 8.35
Johnstown,Pa. B2 .....8.00
Joliet,Ill. A7 .....8.00
KansasCity,Mo. S5 ....8.25
Kokomo,Ind. C16 .....8.10
LosAngeles B3 .....8.95
Minnequa,Colo. C10 ...8.25
Monessen,Pa. P7, P16 ..8.00
Palmer,Mass. W12 .....8.30
Pittsburg,Calif. C11 ...8.95
Portsmouth,O. P12 .....8.00
S.Chicago,Ill. R2 .....8.00
S.SanFrancisco C10 ....8.95
SparrowsPoint,Md. B2 ..8.10
Sterling,Ill.(1) N15 ....8.00
Sterling,Ill. N15 .....8.10
Struthers,O. Y1 .....8.00
Waukegan,Ill. A7 .....8.00
Worcester,Mass. A7 ...8.30

WIRE, Cold Heading Carbon

Elyria,O. W8 .....8.00

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4 .....12.65
Buffalo W12 .....13.40
Cleveland A7 .....12.65
Donora,Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown,Pa.(10) B2 ..12.65
KansasCity,Mo. U3 ...12.90
LosAngeles(2) B3 ....13.60
Minnequa,Colo. C10 ..12.775
Monessen,Pa. P7, P16..12.65
Muncie,Ind. I-7 .....13.60
NewHaven,Conn. A7 ...12.95
Palmer,Mass. W12 ....13.70
Pittsburg,Calif. C11 ...13.45
Portsmouth,O. P12 ....12.65
Roebling,N.J. R5 ....12.95
SparrowsPt.,Md.(10)B2 12.75
Struthers,O. Y1 .....13.40
Trenton,N.J. A7 .....12.95
Waukegan,Ill. A7 .....12.65
Worcester,Mass. A7 ...12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5, U3.10.00
Kokomo,Ind. C16 .....9.85
LosAngeles B3 .....10.70
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16 ..9.75
NewHaven,Conn. A7 ..10.95
Palmer,Mass. W12 ...10.05
Pittsburg,Calif. C11.. 10.075
Portsmouth,O. P12 ...9.75
Roebling,N.J. R5 ....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ..10.70
SparrowsPt.,Md. B2 ...9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Worcester,Mass. A7 ...10.05

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Bartonville,Ill. K4 .....9.85
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Fostoria,O. S1 .....9.80
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5, U3.10.00
LosAngeles B3 .....10.20
Milbury,Mass.(12) N6 .10.05
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16 ..9.75
Muncie,Ind. I-7 .....9.95
Palmer,Mass. W12 ....10.05
Pittsburg,Calif. C11 ...10.20
Portsmouth,O. P12 ....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ..10.70
SparrowsPt.,Md. B2 ...9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Wor'ster,Mass.A7,J4,T6 10.05

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1 .....16.50
Bartonville,Ill. K4 ....16.40
Chicago W13 .....16.30
Cleveland A7 .....16.30
Crawfordsville,Ind. M8.16.40
Fostoria,O. S1 .....16.30
Houston S5 .....16.55
Jacksonville,Fla. M8 ..16.65
Johnstown,Pa. B2 .....16.30
KansasCity,Mo. S5 ....16.55
Kokomo,Ind. C16 .....16.30
Minnequa,Colo. C16 ....16.55
Monessen,Pa. P16 .....16.30
Muncie,Ind. I-7 .....16.50
Palmer,Mass. W12 .....16.60
S.SanFrancisco C10....17.15
Waukegan,Ill. A7 .....16.30
Worcester,Mass. A7, J6.16.60

ROPE WIRE (A)

Bartonville,Ill. K4 ....13.45
Buffalo W12 .....13.45
Fostoria,O. S41 .....13.45
Johnstown,Pa. B2 .....13.45
Monessen,Pa. P7 .....13.45
Muncie,Ind. I-7 .....13.65
Palmer,Mass. W12 ....13.75
Portsmouth,O. P12 ....13.45
Roebling,N.J. R5 ....13.75
St.Louis L8 .....13.45
SparrowsPt.,Md. B2 ...13.55
Struthers,O. Y1 .....13.45
Worcester,Mass. J4 ...13.75
(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Tire Bead

Bartonville,Ill. K4	17.15
Monessen,Pa. P16	17.15
Roebling,N.J. R5	17.65

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Evanston,Ill. M22	12.45
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
NewCastle,Pa. M23	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7, T6	12.65

NAILS, Stock Sizes

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	173
Kokomo,Ind. C16	175
Minnequa,Colo. C10	173
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex D7	$10.30

NAILS, Cut (100 lb kegs)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

TIE WIRE, Automatic Baler

(14½ Ga.) (per 97 lb net box) Coil No. 3150

AlabamaCity,Ala. R2	$8.78
Atlanta A11	10.36
Bartonville,Ill. K4	8.88
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	8.88
Donora,Pa. A7	8.78
Duluth A7	8.78
Fairfield,Ala. T2	8.78
Houston S5	9.02
Jacksonville,Fla. M8	8.88
Johnstown,Pa. B2	8.78
Joliet,Ill. A7	8.78
KansasCity,Mo. S5	9.02
Kokomo,Ind. C16	8.88
LosAngeles B3	9.20
Minnequa,Colo. C10	8.02
Pittsburg,Calif. C11	9.20
S.Chicago,Ill. R2	8.78
S.SanFrancisco C10	9.94
SparrowsPt.,Md. B2	8.88
Sterling,Ill.(37) N15	8.88

Coil No. 6500 Stand. 100 lb coil

AlabamaCity,Ala. R2	$9.06
Atlanta A11	10.70
Bartonville,Ill. K4	9.16
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.16
Donora,Pa. A7	9.06
Duluth A7	9.06
Fairfield,Ala. T2	9.06
Houston S5	9.30
Jacksonville,Fla. M8	9.16
Johnstown,Pa. B2	9.06
Joliet,Ill. A7	9.06
KansasCity,Mo. S5	9.30
Kokomo,Ind. C16	9.16
LosAngeles B3	9.50
Minnequa,Colo. C10	9.30
Pittsburg,Calif. C11	9.50
S.Chicago,Ill. R2	9.06
S.SanFrancisco C10	10.26
SparrowsPt.,Md. B2	9.16
Sterling,Ill.(37) N15	9.16

Coil No. 6500 Interim 100 lb coil

AlabamaCity,Ala. R2	$9.11
Atlanta A11	10.75
Bartonville,Ill. K4	9.21
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.21
Donora,Pa. A7	9.11
Duluth A7	9.11
Fairfield,Ala. T2	9.11
Houston S5	9.35
Jacksonville,Fla. M8	9.21
Johnstown,Pa. B2	9.11
Joliet,Ill. A7	9.11
KansasCity,Mo. S5	9.35
Kokomo,Ind. C16	9.21
LosAngeles B3	9.55
Minnequa,Colo. C10	9.35
Pittsburg,Calif. C11	9.55
S.Chicago,Ill. R2	9.11
S.SanFrancisco C10	10.31
SparrowsPt.,Md. B2	9.21
Sterling,Ill.(37) N15	9.21

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	212
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS

	Col.
Birmingham C15	177
ChicagoHts.,Ill. C2 I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	197*
Bartonville,Ill. K4	199
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196‡
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196‡
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
SparrowsPoint,Md. B2	198‡
Sterling,Ill.(7) N15	198

WIRE (16 gage)	An'ld Stone	Galv. Stone
Ala.City,Ala.R2	17.85	19.40**
Aliq'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Chicago W13	17.85	—
Cleveland A7	17.85	—
Craw'sville M8	17.95	19.80‡‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	17.95	19.80‡‡
Johnstown B2	17.85	19.65§
Kan.City,Mo. S5	18.10	—
Kokomo C16	17.95	19.50†
Minnequa C10	18.10	19.65**
P'lm'r,Mass. W12	19.10	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
SparrowsPt. B2	17.95	19.75‡
St'ling(37) N15	17.95	19.80
Waukegan A7	17.85	19.40†
Worcester A7	18.15	—

WOVEN FENCE, 9-15 Ga. Col.

Ala.City,Ala. R2	187**
Aliq'ppa,Pa. 9-11½ga. J5	190§
Atlanta A11	191*
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(42) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A1	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192

WIRE, Merchant Quality

	6 to 8 gage	An'ld Galv.
Ala.City,Ala. R2	9.00	9.55**
Aliquippa J5	8.65	9.325§
Atlanta(48) A11	9.00	9.75*
Bartonville(48) K4	9.85	19.90
Buffalo W12	9.00	9.55†
Chicago W13	9.00	9.55**
Cleveland A7	9.00	—
Crawfordsville M8	9.10	9.80††
Donora,Pa. A7	9.00	9.55†
Duluth A7	9.00	9.55†
Fairfield T2	9.00	9.55
Houston(48) S5	9.25	9.80**
Jack'vill,Fla. M8	9.10	9.80‡‡
Johnstown(48) B2	9.00	9.675§
Joliet,Ill. A7	9.00	9.55†
KansasCity(48) S5	9.25	9.80**
Kokomo(48) S16	9.10	9.65†
LosAngeles B3	9.95	10.625§
Minnequa C10	9.25	9.80**
Monessen(48) P7	8.65	9.35§
Palmer,Mass. W12	9.30	9.85†
Pitts.,Calif. C11	9.95	10.50†
Rankin,Pa. A7	9.00	9.55†
S.Chicago R2	9.00	9.55**
S.SanFran. C10	9.95	10.50**
Spar'wsPt.(48) B2	9.10	9.775§
St'ling(37)(48) N15	9.10	9.80
Struthers,O. Y1	9.00	9.65‡
Worcester,Mass. A7	9.30	9.85†

Based on zinc prices of: *13.50c. †5c. §10c. ‡Less than 10c. ††10.50c. ‡‡11.10c. **Subject to zinc equalization extras.

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in. larger 12.85

7/16 in. and smaller by 6 in. and shorter: 15% off list.

FASTENERS

Prices are in process of being revised upward and new schedule will be published in Aug. 7 issue.

(Consumer discounts per cent off list prices, orders for 1 container for assorted sizes; for less than container quantities, add 25 per cent; attaching nuts to bolts, package sizes, add 7.5 per cent: heavy hex nuts 1¼ in. through 1½ in. tapped 8 threads, add 10 per cent.)

HEX HEAD CAP SCREWS, coarse, or fine thread, packaged or bulk, with or without hex nuts, 1020 steel bright and high carbon heat treated, ¼ in. thru 1 in. diam., listed lengths:

Hot Galvanized and Zinc Plated:

Packaged	39.25
Bulk	46

BOLTS, Standard stock sizes:

Plain Finish	50

Hot Galvanized and Zinc Plated:

Packaged	39.25
*Bulk	46

*Hot galvanized or zinc plated lag bolts only—for package or bulk quantities use applicable list less bulk discounts.

CAP AND SETSCREWS,

Fillister Head, Cap Screws, Coarse Thread:

Packaged	+55
Bulk	+16

Flat Head Cap Screws:

¾ in. and smaller, 6 in. and shorter:	
Packaged	+85
Bulk	+38

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam., 6 in. and shorter:	
Packaged	+5
Bulk	19
Through 1 in. diam., longer than 6 in.:	
Packaged	+29

HEXAGON NUTS: American Standard: Finished hex, hex jam, and hex slotted coarse or fine thread, ¼ in. through 3 in., finished hex thick, thick and slotted, castle, fine thread, ¼ in. through 1½ in., semifinished hex heavy, heavy and jam, heavy and slotted, coarse thread, ¼ in. through 4 in., and

SQUARE NUTS, American Standard: Regular square and heavy square, coarse thread, ¼ in. through 2 in.:

Plain Finish	50

Hot Galvanized and Zinc Plated:

Packaged	39.25
Bulk	46

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over.)

	Standard Diameter, Inches				
	1/4	5/16	3/8	7/16	1/2
Buffalo W12	$26.20	$38.50	$47.90	$61.30	$80.30
KansasCity,Mo. U3	26.20	38.50	47.90	61.30	80.30
Minnequa,Colo. C10	26.20	38.50	47.90	61.30	80.30
Pittsburg,Calif. C11	26.20	38.50	47.90	61.30	80.30
Roebling,N.J. R5	26.20	38.50	47.90	61.30	80.30
SparrowsPoint,Md. B2	26.20	38.50	47.90	61.30	80.30
St. Louis L8	26.20	38.50	47.90	61.30	80.30
Waukegan,Ill. A7	26.20	38.50	47.90	61.30	80.30

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut length 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	—	27.24	23.12
1¼	13	—	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	58.17	40.26
2½	12	49.24	57.72	43.70
2½	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.65	—	6.725
Ensley,Ala. T2	5.75	5.65	—	6.725
Fairfield,Ala. T2	—	—	—	6.725
Gary,Ind. U5	5.75	5.65	—	—
Huntington,W.Va. C15	—	—	—	6.725
Johnstown,Pa. B2	—	—	—(16)	6.725
Lackawanna,N.Y. B2	5.75	5.65	—	6.725
Minnequa,Colo. C10	5.75	5.65	—	7.225
Steelton,Pa. B2	5.75	5.65	—	—

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	7.025

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

SCREW SPIKES

Lebanon,Pa. B2	15.10

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	15.35
Seattle B3	15.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2, Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

FOOTNOTES

(1) Chicago base.
(2) Double galvanized.
(3) Merchant.
(4) Reinforcing.
(5) 1½ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Limited analyses only.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Bethany A coating.
(12) Worcester, Mass., base.
(15) ¾" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds and 2½ in. and smaller hexagons; 9.625c for larger rounds and hexagons and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1¼		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.75		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 11.50c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	H.R. Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	36.00	....	43.50	39.25	48.50	43.50	
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	46.75
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	45.00
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	49.50
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	29.50	39.50	40.50	44.25	46.75	45.75	52.00	49.50
304L	....	37.25	47.25	48.25	52.00	54.50	53.50	59.75	57.25
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.75	75.75	71.75	80.75	76.75
316L	....	....	55.25	72.25	76.25	79.50	83.50	79.50	88.50	84.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.50	62.25
380	....	....	123.25	....	98.75	143.75	135.00	149.25	149.25
18-8 Cb-Ta	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	75.25
403	....	....	26.75	....	29.75	31.50	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	26.75	31.00	29.75	31.50	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	38.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	42.00
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Somers Brass Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steels, Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates: 5%	Plates: Carbon Base 10%	Plates: Carbon Base 15%	Plates: Carbon Base 20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	49.80	61.35	72.80	84.40	....
Nickel	43.20	55.05	66.95	78.90	....
Nickel, Low Carbon	43.50	55.70	67.95	80.35	....
Monel	44.25	55.35	66.45	77.60	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	36.10	43.00

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. P4; Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	Hi-Carbon-Cr (D-11)	0.955
Spec. Carbon (W-1)	0.385	V-Cr Hot Work (H-13)	0.550
Oil Hardening (O-1)	0.505	W-Cr Hot Work H-12)	0.530
V-Cr Hot Work (H-11)	0.505	W Hot Wk (H-21)	1.425-1.44

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

Prices in dollars per gross ton, f.o.b. (rail) furnace; add 50 cents when shipped by truck. Maximum delivered prices are approximate and based on rail shipment.

Birmingham District	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham R2	62.00	62.50**	66.50	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	68.81	69.31	69.31	69.81
Muskegon, Mich., deld.	....	74.46	74.46	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	75.41	75.91	....
Newark, N.J., deld.	72.53	73.03	73.53	74.03
Philadelphia, deld.	70.18	70.68	71.18	71.68
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Boston, deld.	75.20	75.70	76.20	76.70
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), deld.	....	68.31	68.31	68.81
Monaca, Pa., deld.	....	68.33	68.33	68.83
Lawrenceville, W. Homestead, Wilmerding, Pa., deld.	....	68.68	68.68	69.18
Verona, Trafford, Pa., deld.	68.83	69.33	69.33	69.83
Brackenridge, Pa., deld.	69.16	69.66	69.66	70.16
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....

Other U. S. Districts	Basic	No. 2 Foundry	Malle-able	Besse-mer
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
Granite City, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	66.00	66.50	66.00	....
Rockwood, Tenn. T3	62.00	62.50‡	66.50	67.00
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....
Mansfield, Ohio, deld.	....	....	71.34	....
Canadian District				
Hamilton, Ont. S46	65.00	65.00	65.50	....
Port Colborne, Ont. A25	65.00	65.00	65.50	66.00
Sault Ste. Marie, Ont. A25	65.00	65.00	65.50	66.00

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%. Foundry grade, 1.75% or under, deduct 50c.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 13%; starting with silicon over 13% add $1 per ton for each 0.50% silicon or portion thereof up to 14%; over 14%, price is $93 with $1 differential; add $1 for each 0.50% Mn over 1%)

Buffalo H1	$79.25
Jackson, Ohio I-3, J1	78.00
Port Colborne, Ont. A25	78.50
Toledo, Ohio I-3	78.00

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.50% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Calvert City, Ky. P15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry. K2	89.00
Keokuk, Iowa O.H. & Fdry. 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS IRON, Gross Ton

Birdsboro, Pa. B10 (Phos. 0.075% max)	$73.00
Lyles, Tenn. T3 (Phos. 0.035% max)	73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Buffalo H1 (Intermediate) (0.036-0.075% max)	71.50
Chicago I-3 (Phos. 0.075% max)	71.00
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Phos. 0.075% max)	71.00
Erie, Pa. I-3 (Phos. 0.075% max)	71.00
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00

Steel Service Center Products

Representative prices, cents per pound, f.o.b. warehouse, for 2000 lb orders. Prices will vary with total weight of the order. City delivery charges are 15 cents per 100 lb except: Denver, 20 cents; Baltimore, Boston, New York, Philadelphia, San Francisco, 10 cents; Atlanta, Birmingham, Dallas, Houston, Los Angeles, Seattle, no charge.

	SHEETS			STRIP	BARS				PLATES	
	Hot Rolled	Cold Rolled	Galv.	Hot Rolled	H.R. Rounds	C.F. Rounds	H.R. Alloy 4140	STRUCTURAL SHAPES	Carbon	Floor
Atlanta	9.37	10.61	11.85	10.85	9.53	13.24	....	9.94	9.73	11.16
Baltimore	9.50	10.26	10.06	11.25	9.65	11.70	16.38	9.85	9.60	11.10
Birmingham	8.46	10.20	10.59	9.45	8.26	13.14	16.65	8.47	8.41	10.05
Boston	9.90	10.40	11.52	12.40	10.05	13.35	16.59	10.50	9.83	11.85
Buffalo	9.30	10.05	11.80	11.70	9.45	11.45	16.30	9.90	9.40	11.80
Charlotte, N. C.	9.95	11.22	10.55	11.35	10.00	12.68	....	10.20	9.95	11.75
Chicago	9.22	10.20	10.70	11.39	9.22	10.65	15.95	9.57	9.06	11.35
Cincinnati	9.38	10.26	10.75	11.71	9.33	11.53	16.27	10.14	9.44	11.68
Cleveland	9.22	10.66	10.92	11.51	9.33	11.25	16.06	9.96	9.30	11.59
Dallas	9.07	9.88	11.75	10.63	8.48	12.98	16.95	8.71	8.31	9.68
Detroit	9.48	10.46	11.05	11.76	9.53	11.01	16.23	10.14	9.43	11.61
Denver	9.41	11.77	12.11	9.86	10.10	11.47	....	10.02	9.69	11.83
Houston	8.67	9.48	11.35	10.23	8.08	13.10	16.55	8.31	7.91	11.57
Indianapolis	9.66	10.64	11.14	11.83	9.66	11.09	16.39	10.01	9.50	11.79
Kansas City	9.21	10.87	11.35	10.87	9.31	11.57	15.72	9.80	9.10	....
Los Angeles	10.35	11.20	12.10	12.40	10.25	14.20	17.35	10.45	10.30	12.30
Memphis, Tenn.	9.63	10.35	10.80	11.29	9.48	12.70	16.53	9.67	9.32	11.18
Milwaukee	9.36	10.34	10.84	11.53	9.36	10.89	16.09	9.79	9.20	11.49
Moline, Ill.	9.57	10.55	11.05	11.74	9.57	11.00	16.30	9.92	9.41	11.70
Newark, N. J.	9.81	10.34	11.54	12.37	10.05	13.25	16.40	10.35	9.79	11.82
New York	10.07	10.78	11.35	12.37	10.44	13.25	16.40	10.90	10.22	11.82
Philadelphia	9.50	10.00	10.66	11.25	9.65	11.95	16.38	9.85	9.60	11.10
Pittsburgh	9.22	10.53	11.68	11.49	9.22	11.25	15.95	9.57	9.06	11.35
Portland, Oreg.	10.40	12.25	12.35	12.40	10.40	16.65	17.85	11.00	10.55	12.70
St. Louis	9.42	10.58	11.08	11.59	9.44	11.28	16.33	9.80	9.28	11.59
St. Paul	9.57	10.24	11.39	11.74	9.57	11.49	16.54	9.92	9.41	11.79
San Francisco	10.65	11.65	11.75	12.70	10.55	15.10	17.25	11.10	10.80	12.95
Seattle	11.35	12.45	13.40	12.80	10.80	16.20	17.85	11.50	10.95	13.60
Spokane, Wash.	11.20	12.30	13.25	12.65	10.65	16.20	17.85	11.35	10.80	13.45

Specifications: Hot rolled sheet, sheared edge, 10 Ga. & 36 x 96-120 in.; cold rolled sheets, 20 Ga. & 36 x 96-120 in.; galvanized sheets, 10 Ga. x 36 x 120 in. except Los Angeles, Dallas and Houston, 10 Ga. x 48 x 120 in.; hot rolled strip, ⅜ in. x 1 in.; hot rolled carbon bars, rounds, ⅝ in.—1¼ in., M1020; cold finished bars, 1 in., C1018; hot rolled alloy bars, 4140 annealed, 1⅝ in.—2⅞ in. rounds; structural shapes, I beams, 6 x 12½ in.; carbon plate, sheared, through ½ in. x 84 in.; floor plates, ¼ in. x 36 in.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hitchins, Olive Hill, Ky., Athens, Troup, Tex., Clearfield, Curwensville, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo.; Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., Frostburg, Md., $133; Templeton, Pa., $135; Salina, Pa., $138; Niles, Ohio, $139; Lehi, Utah, $175.

Super-Duty: Ironton, Ohio, St. Louis, Mexico, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Frostburg, Md., $200; Stevens Pottery, Ga., $210; Troup, Tex., $215; Lehi, Utah, $263.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Hawstone, Thompsontown, Pa., Ensley, Ala., Portsmouth, Ohio, St. Louis, $158; Warren, Niles, Windham, Ohio, $163; E. Chicago, Ind., Joliet, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $133; Philadelphia, Clearfield, Pa., $138; Warren, Ohio, $148.

Ladle Brick (per 1000 pieces*)

Dry-Pressed: Alsey, Ill., Johnstown, Pa., Vandalia, Mo., $97; Chester, New Cumberland, W. Va., Freeport, Vanport, Merrill Station, Clearfield, Pa., Wellesville, Irondale, New Salisbury, Ohio, $100; Portsmouth, Ohio, $102; St. Louis, Mexico, Mo., $120; Lehi, Utah, $175.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $250; Danville, Ill., $253; Fords, N. J., Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., Frostburg, Md., $260; Troup, Tex., $265.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., Frostburg, Md., $320; Troup, Tex., Fords, N. J., Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., Frostburg, Md., $360; Troup, Tex., Fords, N. J., Philadelphia, $365.

Tar Bonded Brick (per ton)

Dolomite: Narlo, Ohio, $87.50. Dolomite-Magnesite: Narlo, Ohio, $109.50. Magnetite: Narlo, Ohio, $128.

Sleeves (per 1000)

St. Louis, $193; Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310; Reesdale, Pa., $355.

Runners (per 1000)

Johnstown, Bridgeburg, St. Charles, Clearfield, Pa., $234; Reesdale, Pa., $245.

Dolomite (per ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Mo., $15.60.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines, Chewelah, Wash., $46; minus ⅝ in., grains bulk, Luning, Nev., $46; ⅝ in. grains with fines (periclase), Baltimore, $73, Pascagoula, Miss., $90.

*—9 in. x 4½ x 2.50 straights.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Length	Per 100 lb
2	24	$64.00
2½	30	41.50
3	40	39.25
4	40	37.00
5½	40	36.50
6	60	33.25
7	60	29.75
8, 9, 10	60	29.50
12	72	28.25
14	60	28.25
16	72	27.25
17	60	27.25
18	72	27.00
20	72	26.50
24	84	27.25

CARBON

8	60	14.25
10	60	13.80
12	60	14.75
14	60	14.75
14	72	12.55
17	60	12.65
17	72	12.10
20	90	11.55
24	72, 84	11.95
24	96	12.10
30	84	12.00
35, 40	110	11.60
40	100	12.50

Canadian Steel

(Cents per lb, f.o.b. mill, except as otherwise noted)

Billets, Blooms & Slabs:
Carbon (N.T.):
Forging $97.00
Rerolling 78.00
Alloy (N.T.) 115.00

Wire Rods:
Carbon 5.70
Alloy 6.40

Wire (carload lots):
Merchant annealed . 8.40
Low carbon indus. . 7.20
Upholstery spring .. 8.55
M.B. spring 8.85

Bars & Small Shapes:
Carbon, merchant .. 5.30
Carbon, special 5.85
Alloy 6.40

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $29-$29.50; barge, Brownsville, Tex., $30-$31.

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted.)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85‡
40 mesh, bags	7.50††
Electrolytic Iron, Melting stock, 99.9% Fe, irreg. fragments, ⅛ in. x 1.3 in.	27.75
(In contract lots of 750 tons price is 22.75c.)	
Annealed, 99.5% Fe.	36.75, ton deld. east of Mississippi.
Unannealed (99+% Fe)	33.0
Unannealed (99+% Fe) (minus 325 mesh) ...	58.0
Carbonyl Iron: 90-99.9%, 3 to 20 microns, depending on grade, $8.00-700.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 600-lb drum freight allowed, c.l. 39.80; ton lots	41.80
Brass, 80/20, leaded (60 mesh)	37.80
Bronze powder, 90/10	*56.80*
Copper, all types	15.00*
Lead	7.50*
Manganese, 500 lb and up	25.00*
Nickel, all types ...	0.78-1.06
Nickel-Silver	*56.00*
Solder	7.00*
Stainless Steel, 304 ...	89.00
Stainless Steel, 316 ...	$1.07
Steel, AISI 4650	32.00
Tin	14.00*
Zinc	23.20

Cobalt:	Dollars
98.5%, minus 100-300 mesh ..	1.57-1.58
99.5%, below 5 microns	2.32
Molybdenum	4.35

*Plus cost of metal. ‡Depending on mesh. §Cutting and scarfing grades. **Depending on price of ore. ††Welding grade.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305 ...	$5.65	$5.70	$5.60	$5.50	$5.80
Bar Size Angles	5.85	5.90	5.80	5.70	6.00
Structural Angles	5.75	5.80	5.70	5.60	5.90
I-Beams	5.65	5.70	5.60	5.50	5.80
Channels	5.75	5.80	5.70	5.60	5.90
Plates (basic bessemer)	5.45	5.50	5.40	5.30	5.60
Sheets, hot rolled and galvanized	Nom.	....	Nom.	Nom.	Nom.
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	23.90	23.95	23.85	23.55	25.30
Barbed Wire (†)	6.25	6.30	6.20	6.10	6.40
Merchant Bars	5.95	6.00	5.90	5.80	6.10
Hot-Rolled Bands	5.95	6.00	5.90	5.80	6.10
Wire Rods, Thomas No. 5 (Niederrhein)	5.80*	5.90	5.75	5.75	6.00
Wire Rods, O.H., No. 5 (Niederrhein)	6.00*	6.10	5.95	5.95	6.20
Bright Common Wire Nails (§)	7.35	7.40	7.30	7.20	7.50

†Per 82 lb net reel. §Per 100-lb keg, 20d nails and heavier. *Except Boston.

Ores

Lake Superior Iron Ore

(Prices effective for the 1961 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi nonbessemer	$11.45
Mesabi bessemer	11.60
Old Range nonbessemer	11.70
Old Range bessemer	11.85
Open-hearth lump	12.70
High phos.	11.45

Based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1961; increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

New Jersey, concentrates ..... nom.

Foreign Iron Ore

Cents per unit

Swedish basic, 65%, c.i.f. Atlantic ports	25.00†
Chilean, 62-65%, c.i.f. Atlantic ports ...	22.00
Brazilian (lump), 68.5%, f.o.b. vessel, Victoria, per ton	$11.50

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$15.75-16.25*
Domestic, concentrates, f.o.b. milling points	22.00-23.00

Manganese Ore

Mn 46-48%, Indian, 85-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†

South African Transvaal

44% no ratio	18.75
48% no ratio	24.00-26.00†

Turkish

48% 3:1	35.00-37.00†

Domestic

Rail nearest seller

18% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.40

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard	
55-60%	$3.00-3.50
60-65%	3.60-4.00

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

*Before duty. †Nominal.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa. furnace	$14.75-15.25
Connellsville, Pa. foundry	18.00-18.50

Oven Foundry

Birmingham, ovens	$30.35
Cincinnati, deld.	33.84
Buffalo, ovens	32.00
Chattanooga, Tenn., ovens	30.80
Detroit, ovens	32.00
Pontiac, Mich., deld.	34.05
Saginaw, Mich., deld.	35.63
Erie, Pa., ovens	32.00
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.64
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens..	30.75
New Haven, Conn., ovens	31.00
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.45
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.78
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.	
Pure benzene	34.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	6.00
Toluene, one deg. (deld. east of Rockies)	25.00
Cents per lb, f.o.b. tank cars or tank trucks, deld.	
Phenol, 90 per cent grade	14.75
Per ton bulk, f.o.b. cars or trucks, plant.	
Ammonium sulfate, regular grade	$32.00

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, 10 lb pigs, per gross ton, Palmerton, Pa., 21-23% Mn, $102.50; 19-21% Mn, 1-3% Si, $100; 16-19% Mn, $98. For Neville Island, Pa., prices add $2.50. Lump 35 lb and down: Deduct $2 from 10 lb pig prices at Palmerton.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $220, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Mn 79-81%). Lump $228 per net ton, f.o.b. Anaconda, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 4c for max 0.15% C grade from above prices, 5.3c for max 0.03% C, 6.6c for max 0.5% C, and 8.1c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 24c per lb of contained Mn; packed, carload 25.3c, ton lot of 26.9c, less ton 28.1c.

Electrolytic Manganese Metal: Min carload, bulk, 34.25c; 2000 lb to min carload, 37c; less ton, 39c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 11.6c per lb of alloy. Packed, c.l. 12.8c, ton 13.25c, less ton 14.25c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.2c from above prices. For 3% grade, Si 12.5-16%, deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 5% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.27, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.

Charge Chrome: Cr 58-65%, C 5-7%, Si 4-6%, S 0.03% max, 20.00c per lb of contained Cr, carlots, lump, bulk, delivered.

Blocking Chrome: Cr 55-63%, C 4-6%, Si 8-12%, 23.50c per lb of contained Cr, delivered in carlots, lump, bulk.

Refined Chrome: Cr 58-65%, C 4.25% max, Si 1.0% max, S 0.03%, 21.00c per lb of contained Cr, carlots, lump, bulk, delivered.

Low-Carbon Ferrochrome: (Simplex) Cr 63-66% or 68-71%: C 0.025% max, 31.50c; C 0.010% max, 32.50c per lb of contained Cr, carlots, lump, bulk, delivered.

Cr 68-73%; C 0.25% max, 33.00c. Cr 65-71%; C 0.05% max, 32.00c; C 0.10% max, 31.75c; C 0.20% max, 31.50c; C 0.50% max, 31.25c; C 1.0% max, 31.00c; C 1.5%, 30.75c; C 2.0% max, 30.50c, carlots, lump, bulk, delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25 max). 8M x D, carload, bulk, 20.05c per lb of alloy, carload packed 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max, 22.50c per lb contained Cr and 14.60c per lb contained Si; Cr 33-36%, Si 45-48%, C 0.05% max, 22.50c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (C 99.8% min, metallic basis Fe 0.2% max). Contract, carlot packed, 2" x D plate (above ¼" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5 freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 13.5c per lb contained Si. Packed, c.l. 16.0c, ton lot 17.45c, less ton 19.1c f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Chattanooga, Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.7% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lots, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk, 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). $2.45 per lb (all quantities) of contained W. Delivered.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload, $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3½ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 13.7c per lb of briquet; c.l. packed, bags 14.9c; 3000 lb to c.l., pallets 14.9c; 2000 lb to c.l., bags 16.1c; less ton 17c. Delivered. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 14c per lb briquet; c.l. packed, bags 15.2c; 3000 lb to c.l., pallets 15.2c; 2000 lb to c.l., bags 16.4c; less ton 17.3c. Delivered. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.60 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 4% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 44-47% approx, Ta 15% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots, $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carload, bulk 19.25c per lb of alloy, c.l. packed ½ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l., packed 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

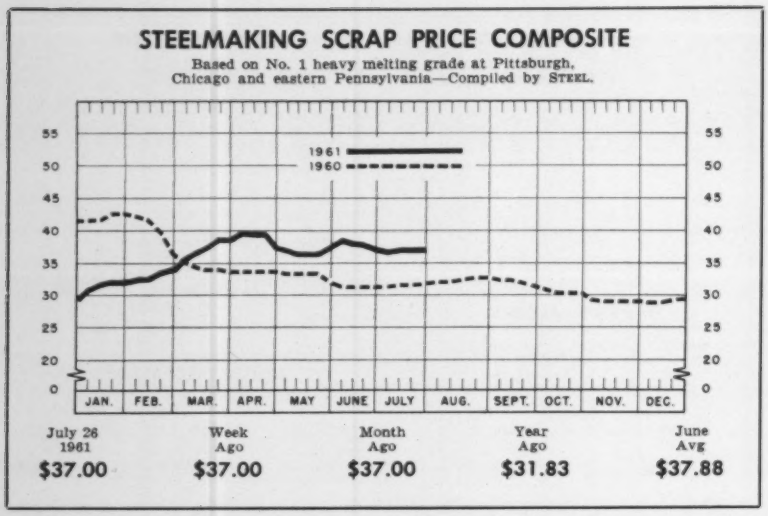
V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Siminal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk, 19.25c. Packed c.l. 20.25c; 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (65-70%). Per lb of contained Mo in 2000-lb container, f.o.b. Langeloth and Washington, Pa., $1.89 in all sizes except powdered which is $1.95.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans $1.60; in bags, $1.59, f.o.b. Langeloth and Washington, Pa.



Scrap Buying Interest Lags

Consensus in trade is that next price move will be upward on prospects of increased consumption in August. STEEL's composite holds at $37 for third consecutive week

Scrap Prices, Page 104

● **Pittsburgh**—Trade sources predict that bids on the August list of No. 1 factory bundles from an automotive plant will be the same as last month's or $1 a ton higher. Lack of consumer buying is forcing some dealers to take almost anything they can get. Brokers who are buying for mills outside the district say some dealers are netting only $20.50 a ton on sales of No. 2 heavy melting.

● **Philadelphia**—Despite slow demand, domestic scrap prices are reasonably strong. Low phos structurals and plates are up $1 to $43-$45; couplers, springs, and wheels, up more than $1 to $44-$45; other grades are unchanged.

A cargo of 6000 tons of turnings from Muskegon, Mich., which recently arrived here afire, has been unloaded, and the ship (the Norwegian *Gyda*) has been sent to drydock for repairs. The ship was to have picked up additional tonnage here for Japan.

● **New York**—An advance in low phos structurals and plate to $34-$35 features an otherwise unchanged market on scrap. In general, brokers' buying prices have shown little variation this month. Domestic buying has been light, but steady. Foreign buying, the main support of the market here, has eased, but has been sufficient to sustain price levels.

● **Youngstown**—The scrap market here remains dull. Attracted by slightly higher prices here, scrap is moving from the Pittsburgh area, but the spread is so small the tonnage isn't large.

● **Detroit**—Sixteen foreign freighters were taking on scrap in the Detroit waterway last week. Most of the material is bound for the Far East, particularly Japan.

Sometimes a trickle, sometimes a flood, this flow of scrap has been continual since the shipping season opened. It's the strongest reason that prices have held fairly steady through the spring and summer. Although most of the scrap being loaded was purchased some months ago, there are enough fill-ins on orders to keep dealers and brokers jockeying for business.

With auto lists closing, prices are expected to hold steady, possibly rise a fraction because of the limited amount of scrap to be generated by carbuilders in August.

● **Chicago**—The bottom has probably been reached in steelmaking scrap prices. While a firming is discernible in some grades, the market is holding. Steelmaking operations will probably be slightly higher in August than they were in July, but until the automotive industry's labor situation is settled, steel production planning for the next several months is going to be done guardedly.

Demand for cast scrap is a little improved and should be even better now that gray iron foundries are concluding their vacation shutdowns.

● **Buffalo**—Diverse price trends in railroad scrap grades are reported here. Most railroad items are off $1 a ton in new railroad lists, but rerolling rails are $1.50 a ton higher at $63.50-$64.50.

Mill scrap grades were nominally unchanged in the absence of new business. If mills place new orders at the start of August, they are expected to do so at or near current price levels. Failure of mills to come into the market next month likely would force mill grades into lower ground.

● **Cincinnati**—Two area mills are expected to enter the scrap market this week for August delivery. It's likely their programs will see a sideways movement in the dealer market unless the mills place large tonnage orders.

● **St. Louis**—The scrap market has a strong undertone, and some prices have inched up. The largest mill here has raised prices $1 on No. 2 heavy melting and $1 on No. 2 bundles. It is also paying $2 more for 2 ft foundry steel, which is now listed at $31 a ton. Some upward movement is evident in rail scrap, but because small tonnages are moving, the hike is not significant.

● **Birmingham** — A mixed price trend has developed in the scrap market here. No. 1 heavy melting and No. 1 bundles are up 50 cents a ton; No. 2 bundles and No. 1 wheels, up $1; and No. 1 cupola cast, off 50 cents. Shovel turnings are quoted unchanged at $20-$21 a ton, but a substantial tonnage has been bought at $2 above this level. Brokers still quote No. 1 railroad heavy melting at $38-$39, but one mill has paid $40-$41.

● **Houston** — One major mill in Texas has placed its orders for Au-

gust. Prices for No. 2 heavy melting steel at $33 and No. 2 bundles at $23 are $1 a ton higher than current quotations.

In Baton Rouge, La., and New Orleans, the export price for No. 2 steel is $35-$36. Some exporters are willing to go as high as $40.50-$41—for No. 1 steel in ample tonnages.

• **San Francisco**—The steel scrap market is devoid of excitement. Prices are holding, but many of the postings are nominal since mills have been buying little. Exports continue to support the market as they have for many months.

• **Los Angeles**—Mill vacations are stemming the flow of scrap. Because of short supplies, yards are unable to meet fairly strong demand, primarily from Japan. The shortage is not likely to be long term, once mills are back in full operation; thus, a price increase is not probable.

Pig Iron . . .

Pig Iron Prices, Page 99

Merchant pig iron demand still drags, although a slight gain in orders in August is anticipated because there will be less downtime for vacations at various foundries.

Demand for iron for export continues active at Buffalo with large tonnages moving via the St. Lawrence Seaway and the Barge Canal. Shipments to the Midwest via lake freighter are expected to accelerate in August.

Republic Steel Corp. has resumed production in one of its two idle blast furnaces at its Thomas Works, Birmingham. The furnace had been idle four months. The second furnace has been idle for over a year and a half.

Phoenix Steel Corp., Phoenixville, Pa., plans to relight its blast furnace at Chester, Pa., about Aug. 1. The furnace, idle since May, 1960, has been equipped with a new and larger turboblower that will increase capacity.

Blast furnace production in the U. S. totaled 5,730,198 net tons during June, the highest monthly total since May, 1960, when the figure was 6,394,411 net tons of pig iron and ferroalloys. During May, the output was 5,693,628 tons, says the American Iron & Steel Institute, New York.

New American Can Div. To Build Canning Plants

American Can Co., New York, is forming a new division, Custom Packers, to serve soft drink companies by establishing a network of high speed canning operations. The company will pack for soft drink producers in cans and cartons of their own choosing, whether they are supplied by American Can or any of its competitors.

Consumption of soft drinks in cans is growing at a rate of more than 50 per cent a year. More than 1 billion carbonated soft drinks in cans will be sold this year.

The initial operations of the Custom Packers network will be in the Winston-Salem-Greensboro, N. C., area, Jacksonville, Fla., Baltimore, Cincinnati, New Orleans, and St. Louis.

Fastener Prices Rise

Prices of several forms of threaded fasteners are being revised upward an average of 4.5 to 5 per cent. The increases are being made through reduction of discounts.

Among companies making increases are National Screw & Mfg. Co., Cleveland, which made the changes effective July 24, and Screw & Bolt Corp. of America, Pittsburgh, where the effective date was July 28.

Products affected include cap screws and nuts. Unchanged are small screw items, rivets, and track bolts.

Screw & Bolt Corp.'s new discounts on hex head, cap screws and nuts are 29 per cent for less than a full container, 43 per cent for a whole container, and 53 per cent for 20,000 lb and over.

Plates . . .

Plate Prices, Page 94

Sheared carbon plate demand is only fair, with deliveries ranging from 10 days to three weeks, slightly more extended than recently. Alloy plate deliveries average around five weeks. Considerable activity is noted in specialties, such as stainless clad for the oil and chemical industries. Floor plates also are moving well.

Railroad tonnage is light, but the Pennsylvania and the Norfolk & Western have work coming up by late August or early September. Included in the proposed Pennsylvania program will be the rebuilding of bodies for 2500 hopper cars.

Alan Wood Steel Co., Conshohocken, Pa., will cease production of sheared plates Aug. 10 and will resume Aug. 28 on a new and larger mill which will replace the present unit.

Plate fabricating subcontracts, including submarine hull sections, are being farmed out by the Naval shipyard at Portsmouth, N. H.; the last of six closes Aug. 11. Welding, machining, and heavy duty machinery is required. Considerable work is on grade Hy-80 plates.

Steel Bars . . .

Bar Prices, Page 94

After a strong June, carbon and alloy bar producers had a weak July. June was good because of brisk automotive demand. One barmaker told STEEL its Detroit office "booked so much tonnage in June that in other years we would have been forced to cut them back."

July dropped abruptly because of vacations in customer plants. A medium sized bar producer commented that "it looks like everybody forgot our address" and predicted that his July shipments would be 10 per cent below June's.

LOOKING FOR SURPLUS MACHINERY?

By checking the classified pages of STEEL each week you'll be able to find many different types of equipment which will fit your requirements. Used or surplus equipment—you can best find it in STEEL's classified columns.

HOT DIP GALVANIZING

JOSEPH P. CATTIE & BROTHERS, INC.

2520 East Hagert Street

Phone: Re-9-8911 Philadelphia 25, Pa.

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, July 26, 1961. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

July 26	$37.00
July 19	37.00
June Avg.	37.88
July 1960	31.63
July 1956	47.70

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	28.00-29.00
No. 1 dealer bundles	36.00-37.00
No. 2 bundles	23.00-24.00
No. 1 busheling	35.00-36.00
No. 1 factory bundles	43.00-44.00
Machine shop turnings	14.00-15.00
Mixed borings, turnings	14.00-15.00
Short turnings	19.00-20.00
Cast iron borings	18.00-19.00
Cut structurals:	
2 ft and under	*42.00-43.00*
3 ft and under	*39.00-40.00*
Heavy turnings	27.00-28.00
Punching & plate scrap	*43.00-44.00*
Electric furnace bundles	43.00-44.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	34.00-35.00
Stove plate	34.00-35.00
Unstripped motor blocks	24.00-25.00
Clean auto cast	35.00-36.00
Drop broken machinery	45.00-46.00§

Railroad Scrap

No. 1 R.R. heavy melt.	*40.00-41.00*
Rails, 2 ft and under	50.00-51.00
Rails, 18 in. and under	51.00-52.00
Random rails	45.00-46.00
Angles, splice bars	44.00-45.00
Railroad specialties	45.00-46.00
Rails, rerolling	59.00-60.00

Stainless Steel Scrap

18-8 bundles & solids	180.00-185.00
18-8 turnings	105.00-110.00
430 bundles & solids	85.00-90.00
410 turnings	50.00-55.00

CHICAGO

No. 1 hvy melt., indus.	37.00-38.00
No. 1 hvy melt., dealer	35.00-36.00
No. 2 hvy melting	30.00-31.00
No. 1 factory bundles	41.00-42.00
No. 1 dealer bundles	36.00-37.00
No. 2 bundles	21.00-22.00
No. 1 busheling, indus.	37.00-38.00
No. 1 busheling, dealer	35.00-36.00
Machine shop turnings	15.00-16.00
Mixed borings, turnings	17.00-18.00
Shovel turnings	17.00-18.00
Cast iron borings	17.00-18.00
Cut structurals, 3 ft	*43.00-44.00*
Punchings & plate scrap	*44.00-45.00*

Cast Iron Grades

No. 1 cupola	41.00-42.00
Stove plate	36.00-37.00
Unstripped motor blocks	33.00-34.00
Clean auto cast	46.00-47.00
Drop broken machinery	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	*39.00-40.00*
R.R. malleable	47.00-48.00
Rails, 2 ft and under	49.00-50.00
Rails, 18 in. and under	50.00-51.00
Angles, splice bars	44.00-45.00
Axles	56.00-57.00
Rails, rerolling	58.00-59.00

Stainless Steel Scrap

18-8 bundles, solids	185.00-190.00
18-8 turnings	105.00-110.00
430 bundles & solids	90.00-95.00
430 turnings	50.00-55.00

BUFFALO

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	26.00-27.00
No. 1 bundles	31.00-32.00
No. 2 bundles	24.00-25.00
No. 1 busheling	31.00-32.00
Shovel turnings	17.00-18.00
Machine shop turnings	13.00-14.00
Cast iron borings	15.00-16.00
Low phos. structurals and plates, 2 ft and under	39.00-40.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	37.00-38.00
No. 1 machinery	44.00-45.00

Railroad Scrap

Rails, random lengths	42.00-43.00
Rails, 3 ft and under	48.00-49.00
Railroad specialties	41.00-42.00
Rails, rerolling	*63.50-64.50*

CLEVELAND

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	24.00-25.00†
No. 1 factory bundles	*42.00-43.00*
No. 1 bundles	35.00-36.00
No. 2 bundles	23.00-24.00†
No. 1 busheling	35.00-36.00
Machine shop turnings	12.00-13.00
Shovel turnings	16.00-17.00
Mixed borings, turnings	16.00-17.00
Cast iron borings	16.00-17.00
Cut foundry steel	30.00-33.00
Cut structurals, plate, 2 ft and under	*40.00-41.00*
Low phos. punchings & plate	37.00-38.00
Alloy free, short shovel turnings	18.00-19.00
Electric furnace bundles	37.00-38.00

Cast Iron Grades

No. 1 cupola	39.00-40.00
Charging box cast	26.00-27.00
Heavy breakable cast	28.00-29.00
Stove plate	36.00-37.00
Unstripped motor blocks	31.00-32.00
Brake shoes	37.00-38.00
Clean auto cast	47.00-48.00
Burnt cast	32.00-33.00
Drop broken machinery	48.00-49.00

Railroad Scrap

R.R. malleable	47.00-48.00
Rails, 2 ft and under	48.00-49.00
Rails, random lengths	44.00-45.00
Rails, 18 in. and under	49.00-50.00
Cast Steel	41.00-42.00
No. 1 railroad cast	48.00-49.00
Railroad specialties	43.00-44.00
Angles, splice bars	44.00-45.00
Rails, rerolling	55.00-56.00

Stainless Steel Scrap (Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	160.00-165.00
18-8 turnings	95.00-100.00
430 clips, bundles, solids	80.00-85.00
430 turnings	15.00-25.00†

YOUNGSTOWN

No. 1 heavy melting	38.00-39.00
No. 2 heavy melting	25.00-26.00†
No. 1 busheling	*39.00-40.00*
No. 1 bundles	*40.00-41.00*
No. 2 bundles	25.00-26.00†
Machine shop turnings	14.00-15.00†
Shovel turnings	19.00-20.00†
Cast iron borings	19.00-20.00†
Low phos.	*41.00-42.00*
Electric furnace bundles	*41.00-42.00*

Railroad Scrap

No. 1 R.R. heavy melt.	40.00-41.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	27.50-28.50
No. 1 bundles	33.00-34.00
No. 2 bundles	20.00-21.00
No. 1 busheling	32.00-33.00
Machine shop turnings	9.00-10.00
Mixed borings, turnings	11.00-12.00
Shovel turnings	12.00-13.00
Cast iron borings	11.00-12.00
Low phos. 18 in.	39.00-40.00

Cast Iron Grades

No. 1 cupola	34.00-35.00
Heavy breakable cast	28.00-29.00
Charging box cast	34.00-35.00
Drop broken machinery	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	36.00-37.00
Rails, 18 in. and under	47.00-48.00
Rails, random lengths	41.00-42.00

ST. LOUIS (Brokers' buying prices)

No. 1 heavy melting	34.00
No. 2 heavy melting	*29.00*
No. 1 bundles	35.00
No. 2 bundles	*24.00*
No. 1 busheling	34.00
Machine shop turnings	13.00
Shovel turnings	15.00

Cast Iron Grades

No. 1 cupola	37.00
Charging box cast	34.00
Heavy breakable cast	32.00
Unstripped motor blocks	34.00
Clean auto cast	38.00
Stove plate	32.00

Railroad Scrap

No. 1 R.R. heavy melt.	*35.00*
Rails, random lengths	*39.00*
Rails, rerolling	*55.00*
Rails, 18 in. and under	*44.00†*
Angles, splice bars	40.00†

PHILADELPHIA

No. 1 heavy melting	39.00
No. 2 heavy melting	35.00
No. 1 bundles	43.00
No. 2 bundles	24.00-26.00
No. 1 busheling	43.00
Electric furnace bundles	44.00
Mixed borings, turnings	17.00†
Shovel turnings	20.00
Machine shop turnings	14.00
Heavy turnings	25.00†
Structurals & plates	*43.00-45.00*
Couplers, springs, wheels	*44.00-45.00*
Rail crops, 2 ft & under	51.00-53.00

Cast Iron Grades

No. 1 cupola	40.00
Heavy breakable cast	40.00
Drop broken machinery	49.00-50.00†
Malleable	49.00†

NEW YORK (Brokers' buying prices)

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	23.00-24.00
No. 1 bundles	30.00-31.00
No. 2 bundles	20.00-21.00
Machine shop turnings	4.50-5.00†
Mixed borings, turnings	5.00-5.50†
Shovel turnings	6.00-7.00†
Low phos. structurals & plates	*34.00-35.00*

Cast Iron Grades

No. 1 cupola	34.00-35.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	31.00-32.00

Stainless Steel

18-8 sheets, clips, solids	155.00-160.00
18-8 borings, turnings	70.00-75.00
410 sheets, clips, solids	40.00-45.00
430 sheets, clips, solids	55.00-60.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	28.50-29.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	28.00-29.00
No. 1 busheling	28.50-29.00
Machine shop turnings	5.00-6.00
Shovel turnings	9.00-9.50
No. 1 cast	39.00-40.00
Mixed cupola cast	32.00-33.00
No. 1 machinery cast	40.00-42.00

DETROIT (Brokers' buying prices)

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	35.00-36.00
No. 2 bundles	23.00-24.00
No. 1 busheling	31.00-32.00
Machine shop turnings	10.00-11.00
Mixed borings, turnings	11.00-12.00
Shovel turnings	12.00-13.00

Cast Iron Grades

No. 1 cupola	32.00-33.00
Mixed cast	30.00-31.00
Stove plate	27.00-28.00
Heavy breakable	26.00-27.00
Unstripped motor blocks	22.00-23.00
Clean auto cast	39.00-40.00

Stainless Steel Scrap

18-8 bundles & solids	170.00-175.00
18-8 turnings	70.00-75.00
430 bundles & solids	70.00-75.00
430 turnings	11.00-12.00

BIRMINGHAM

No. 1 heavy melting	*37.50-38.50*
No. 2 heavy melting	29.00-30.00
No. 1 bundles	*37.50-38.50*
No. 2 bundles	*21.00-22.00*
No. 1 busheling	38.00-39.00
Cast iron borings	10.00-11.00
Machine shop turnings	18.00-19.00
Shovel turnings	20.00-21.00
Bar crops and plate	43.00-44.00
Structurals & plate	42.00-43.00
Electric furnace bundles	38.00-39.00
Electric furnace:	
3 ft and under	36.00-37.00
2 ft and under	37.00-38.00

Cast Iron Grades

No. 1 cupola	*41.50-42.50*
Stove plate	42.00-43.00
Unstripped motor blocks	31.00-32.00
No. 1 wheels	*35.00-36.00*

Railroad Scrap

No. 1 R.R. heavy melt.	38.00-39.00
Rails, 2 ft and under	46.00-47.00
Rails, random lengths	41.00-42.00
Angles, splice bars	44.00-45.00

HOUSTON

(Brokers' buying prices; f.o.b. car)

No. 1 heavy melting	35.00
No. 2 heavy melting	31.00-32.00
No. 1 bundles	35.00-36.00
No. 2 bundles	21.00-22.00
Machine shop turnings	10.00-11.00
Low phos. plate & structurals:	
3 ft	38.00-39.00
2 ft and under	43.00-44.00

Cast Iron Grades

No. 1 cupola	38.00-39.00
Heavy breakable	26.00-27.00
Foundry malleable	30.00-31.00
Unstripped motor blocks	31.00-32.00

Railroad Scrap

R.R. heavy melt. (3 ft)	37.00-38.00

LOS ANGELES

No. 1 heavy melting	40.00-42.00
No. 2 heavy melting	39.00
No. 1 bundles	40.00-41.00
No. 2 bundles (export)	30.00-31.00
Machine shop turnings	15.00-17.00
Shovel turnings	15.00-17.00
Cast iron borings	16.00-17.00
Electric furnace scrap	50.00

Cast Iron Grades

No. 1 cupola	44.00-46.00

Railroad Scrap

No. 1 R.R. heavy melt.	42.00

PORTLAND, OREG.

(Prepared, f.o.b. car)

No. 1 heavy melting	44.00-45.00
No. 2 heavy melting	41.00-42.00
No. 2 bundles	31.00
Shovel turnings	18.00
Electric furnace	54.00

Cast Iron Grades

No. 1 cupola	42.00
Heavy breakable	38.00
Unstripped motor blocks	39.00
Stove plate (f.o.b. plant)	37.00

SEATTLE (Prepared, f.o.b. car)

No. 1 heavy melting	44.00-45.00
No. 1 hvy (unprepared)	39.00
No. 2 heavy melting	41.00-42.00
No. 2 hvy (unprepared)	36.00
No. 2 bundles	31.00
Shovel turnings	16.00-18.00
Electric furnace	52.00

Cast Iron Grades

No. 1 cupola	42.00
Heavy breakable cast	39.00
Stove plate (f.o.b. plant)	37.00
Unstripped motor blocks	39.00

SAN FRANCISCO

No. 1 heavy melting	43.00**
No. 2 heavy melting	40.00**
No. 1 bundles	34.00**
No. 2 bundles	28.00**
Machine shop turnings	18.00
Mixed borings, turnings	18.00
Cast iron borings	18.00
Heavy turnings	18.00
Shovel turnings	18.00

Cast Iron Grades

No. 1 cupola	46.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	45.00-46.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices; net tons)

No. 1 heavy melting	31.00
No. 2 hvy melt, 2 ft & under	*30.00*
No. 1 bundles	31.00
No. 2 bundles	*23.50*
Mixed steel scrap	23.00
Mixed borings, turnings	12.00
Busheling, new factory:	
Prepared	31.00
Unprepared	25.00
Shovel turnings	12.00

Cast Iron Grades‡

No. 1 machinery cast	32.00

**Based mainly on export sales.
†Nominal.
‡F.o.b. Hamilton, Ont.
§Delivered.

In the last few days, there has been a moderate pickup. Many customers have ended their vacations and have resumed ordering. Automotive purchases for August and September are termed "excellent" by one mill. It expects its August shipments to be nearly as large as June's, and that month's were the largest in more than a year.

Production of the M-14 rifle will be expedited. Two commercial shops are now producing the item at Worcester, Mass., and New Haven, Conn., and a third source is being negotiated.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 95

Order backlog of concrete reinforcing bars is the largest among the heavier finished steel products. Unfilled business is unevenly distributed among mills and distributors because of prolonged price competition which has discouraged some sellers from estimating on a substantial volume of new business. Bridge and highway bar prices are the weaker segment of the market.

Rails, Cars . . .

Track Material Prices, Page 97

While domestic freight car orders may be a shade more numerous, total buying remains light. Some builders estimate demand is running about parallel with that of a month ago.

June orders totaled 1214 cars, the American Railway Car Institute and the Association of American Railroads said. That compares with 3666 for May and 321 for June last year.

Deliveries in June totaled 3142 freight cars compared with 3360 in May and 6042 in June, 1960.

Cars on order as of July 1 amounted to 8489 in railroad shops and 3332 in commercial shops, a total of 11,821 vs. 13,964 on June 1 and 29,555 on July 1 last year. Of the units on order at the beginning of this month, 2836 were boxcars, 2560 hoppers, 1956 gondolas, 1602 refrigerators, and 1332 flatcars. Others included 639 tankcars, 575 covered hoppers, and 200 cabooses.

Pullman-Standard Div., Pullman Inc., has orders for 221 new type flatcars on which production has begun at its Butler, Pa., plant.

The new type flatcar is an adaptation of Pullman-Standard's Lo-Dek which was brought out a year ago to haul new autos. The new model is nearly 2 ft longer and 11 in. lower than conventional flatcars. It is equipped with three-tier racks capable of hauling 15 autos compared with four in boxcars.

Wire . . .

Wire Prices, Pages 96 & 97

After improving steadily for five months, demand for manufacturers' wire fell sharply in July. A medium sized producer says its shipments dropped about 20 per cent, largely because of vacations in customer plants. August shipments will probably be about 15 per cent higher than July's. They're not likely to equal those of May or June.

Wiremakers look for a substantial pickup in order entry after Aug. 15. That's when makers of autos, furniture, and appliances will be ordering springs needed for their new product lines.

Buying of finished wire for reinforcing or construction work is heavier in New England than for industrial end goods. One high carbon, specialty mill in the East plans to increase operations 4 points to 73 per cent of capacity. Like drawn wire, rod volume is slow, although consumer stocks in both cases are generally low.

Structural Bookings Dip

June bookings of structurals amounted to 297,555 tons, off sharply from 391,730 tons in May, but down only slightly from the 299,596 tons in June, 1960, reports the American Institute of Steel Construction. Total bookings for the first half amounted to 1,858,825 tons, off 4 per cent from 1,940,982 tons in the same period in 1960.

Shipments continued at a level above the average for June, representing the second best month so far this year. The industry delivered 361,159 tons, only slightly below May's 17 month high of 365,000 tons. Total shipments for the first

(*Please turn to Page* 109)

Steel Shipments by Markets—May, 1961

(All grades, carbon, alloy, stainless)

(Net tons)

Markets	May Shipments 1961	May Shipments 1960	First Five Months 1961	First Five Months 1960
Converting & Processing	219,160	241,407	955,076	1,628,802
Forgings (except auto)	68,224	67,307	297,487	481,089
Fasteners	82,019	80,066	346,294	603,730
Warehouses:				
Oil & Gas	118,416	68,879	525,762	594,387
All Other	998,413	1,025,981	4,077,823	6,132,088
Total Warehouse	1,116,829	1,094,860	4,603,585	6,726,475
Construction:				
Oil & Gas	201,035	241,354	775,191	1,025,819
All Other	652,238	674,987	2,712,230	3,663,973
Total Construction	853,273	916,341	3,487,421	4,689,792
Contractors' Products	359,097	341,248	1,460,338	1,895,223
Automotive:				
Vehicles, Parts	1,183,101	1,037,704	4,247,534	7,302,470
Forgings	41,169	22,325	150,670	246,707
Total Automotive	1,224,270	1,060,029	4,398,204	7,549,177
Rail Transportation:				
Rails, Track, etc.	45,154	94,029	205,353	470,209
Cars & Locomotives	77,909	176,592	384,464	1,075,594
Rapid Transit	1,268	1,282	14,229	17,539
Total Railroad	124,331	271,903	604,046	1,563,342
Shipbuilding	61,016	46,185	249,051	298,899
Aircraft	6,347	7,753	29,688	39,579
Oil & Gas Drilling	30,656	30,185	149,773	241,040
Mining, Quarrying, etc.	24,857	26,356	105,259	146,110
Agricultural:				
Machinery	56,448	54,061	299,932	429,820
All Other	35,095	20,910	131,011	122,603
Total Agricultural	91,543	74,971	430,943	552,423
Machinery, Tools, etc.	336,856	364,785	1,449,129	2,234,110
Elec. Machinery	169,941	169,323	769,162	1,045,391
Appliances, Utensils	150,699	156,269	686,723	1,002,812
Other Domestic Equipment	154,547	196,496	698,429	992,421
Containers:				
Cans and Closures	539,159	471,736	2,385,580	2,430,435
Barrels, Drums, etc.	64,867	73,879	305,588	435,729
All Other	47,858	60,192	171,157	325,340
Total Containers	651,884	605,807	2,862,325	3,191,504
Ordnance, Military	10,076	10,415	60,836	59,432
Exports	134,708	328,348	623,111	1,051,157
Nonclassified	177,358	182,378	832,253	949,046
Total Shipments	6,047,691	6,272,432	25,099,133	36,941,554

Data from American Iron & Steel Institute.

Stocks Have Moved Up Since May

(Percentage of purchasing agents responding to STEEL inventory survey)

	Under 10 Days		10-30 Days		30-60 Days		60-90 Days		3-6 Mo	
	Now	3 Mo Ago	Now	3 Mo Ago	Now	3 Mo Ago	Now	3 Mo Ago	Now	3 Mo Ago
Copper, Copper-Base Alloys	10	20	21	27	37	33	32	20	..	..
Copper Wire, Cable	20	17	13	..	47	66	20	17	..	..
Aluminum Mill Products	8	8	8	15	46	46	23	23	15	8
Aluminum Ingots	29	40	14	40	43	..	14	20	..	..
Zinc Diecasting Alloys	29	40	14	20	14	20	43	20	..	..

Underlined figures indicate number of days' inventory carried by the greatest number of respondents.

Nonferrous Users Stand Pat on Stocks

Nonferrous Metal Prices, Pages 108 & 109

ONLY moderate changes in consumer stocks of nonferrous metals are expected in the next three months.

The trend to replenish inventories that began in the second quarter will be continued by some users. Others (fewer) have excessive stocks and will continue to pare them. Three months hence, most will hold about the same inventory as now.

Those are the highlights of STEEL's nationwide quarterly survey of purchasing agents.

● **What's Ahead** — User inventory plans break down this way: In copper and copper alloys, 74 per cent will hold stocks at current levels, 16 per cent will add to them, and 10 per cent will trim. Copper wire and cable stocks will be increased by 6 per cent of consumers, cut by another 6 per cent, and the remaining 88 per cent will hold fast. In aluminum mill products, an almost even split is shown between those planning to add to stocks and those that will trim: 25 per cent will trim, 21 per cent will raise, and 54 per cent will stand pat. The most significant trend to build up stocks is among users of aluminum ingots and zinc alloys for diecastings. In both cases, 13 per cent of the users will increase stocks while the remaining 87 per cent will hold steady.

The buying forecasts indicate the average metalworking firm will be carrying nonferrous stocks of 30 to 60 days over the next three months.

● **Past Pattern** — The majority of metalworking companies are carrying the same number of days' inventory as they did in May (see table). But some significant shifts showed up in the three month period. In copper and copper-base alloys, 32 per cent lowered stocks, 5 per cent increased; in aluminum mill products, 32 per cent cut, 20 per cent raised; and in zinc alloys for diecasting, 13 per cent have lowered.

Aluminum Improves

Warehouse sales of aluminum will increase in every major product category this year if current forecasts hold up. The National Association of Aluminum Distributors polled its membership and came up with the following forecast for 1961: Sheets, plates, and coils, up 12.8 per cent from 1960; wire, rods, bars, and structurals, up 7.3 per cent; extrusions and pipe, up 13.5 per cent. The distributors predicted tubing sales would be only a shade better, up 0.5 per cent.

● **Primary Up** — Symptomatic of better consumer demand is a steady climb in primary production.

● **Consumption Breaking**—During 1961's first quarter, a higher percentage of aluminum output found its way into consumer durable goods and machinery and equipment, reports the Aluminum Association. The transportation industry took less but remained the second highest user. Here is the breakdown of shipments of semifabricated products to consuming industries in percentage: Building products, 18.9; transportation, 13.8; containers and packaging, 12.4; consumer durable goods, 10.7; electrical, 8.6; machinery and equipment (except electrical), 5.1; distributors and jobbers, 18.5; shipments for conversion into wrought products, 6.3; exports, 2.4; and miscellaneous and unidentified uses, 3.3.

Value Analysis Fact Sheet

ANACONDA FREE-CUTTING BRASS ROD

Not the plain old work horse many think, it can be produced with a variety of valuable properties—in addition to high machinability—to do many special jobs better, and at lower cost.

For the great majority of high-speed screw machine jobs, free-cutting brass rod is a standard shelf item.

But in an increasing number of jobs, the free-cutting property alone is not enough. Deep drilling to close tolerances, roll-threading, knurling, staking, slotting, etc., call for uniformity in a variety of other property combinations.

Fortunately free-cutting brass is a unique "on the fence" alloy (see Metallurgical Comment at the right) that can be adapted to answer these new demands—help screw machine operators meet increasingly rigid requirements and utilize cost-saving practices.

Specialized applications. Over the past several years, Anaconda American Brass has introduced several refinements into the usual mill practice for free-cutting brass and has developed different rods for specialized applications. In most instances, these rods will still meet ASTM and Government specifications.

Chip breaking. For the user who demands a rod with uniform ability to break up into small chips, an alloy is supplied which regularly contains substantial quantities of beta. This, because it is brittle at room temperature, adds to the chip-breaking ability of the lead already there. This rod is, therefore, particularly good for high-speed forming and drilling applications. On the other hand, it is the least ductile and can therefore be formed and headed to the least extent.

Cold forming. The usual and more numerous special applications require uniform ability to be cold-worked—as in roll-threading, knurling, heading, and other deforming. Properties of these special rods are refined by heat treatment or special drawing operations so that the rod can be consistently cold-worked. Normally, there is little sacrifice in machinability, but there is some loss in the ability of the rod to break into small chips.

Deep drilling. In small rod particularly, there has been an increasing demand for material that can be drilled to close tolerances. Special drawing and heat treating practices were developed to produce a rod which performs uniformly, even in such exacting applications as ball point pen tips.

High Strength. And for those applications calling for uniformly higher strength than the usual material, there is a rod produced by special drawing practices.

Technical assistance. If you have a special problem—whether it involves a variation of free-cutting brass or another free-cutting or engineering copper alloy—call in your Anaconda American Brass representative. He'll make available to you the experience and services of metallurgical and mill specialists. Or write: Anaconda American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont. 6148

FOR MORE INFORMATION about Anaconda Rods for Screw Machine Products—including physical properties, mechanical properties, composition and machinability — write for Publication B-14. Address: Anaconda American Brass Company, Waterbury 20, Connecticut.

Metallurgical Comment

Free-Cutting Brass can provide relatively wide variations in temper and ductility within the range of composition defined in ASTM and Government specifications (60 to 63% Cu, 2.5 to 3.7% Pb, remainder Zn).

In the commonly available rod temper, referred to in ASTM specifications as "half hard" and more commonly in the trade as "hard," tensile strength may range from 50,000 to 70,000 psi, depending on the rod size and the manufacturer.* And there can be a comparable variation in cold-working properties.

Here's why. The range of 60 to 63% copper was selected for free-cutting brass because it is the lowest which can be used to produce an alloy that can be hot-worked readily and also cold-worked. This means a brass that can be hot-extruded down to small sizes—and that later can be cold-worked to a modest degree.

In more technical terms, free-cutting brass is at the transition point between the alpha phase (the ductile form of the alloy) and the beta phase (the form that's hard and brittle at room temperature but readily worked when hot). Thus, relatively minor changes in composition and fabrication practices can make substantial shifts in the proportion of alpha and beta grains—hence in strength and ductility. Various combinations of these properties can be maintained uniformly by careful control of mill practices.

Free-cutting property of the alloy is, of course, provided by lead dispersed through it—and is not materially affected by changes in other properties.

Standard Anaconda Free-Cutting Brass-271 has a composition of 61.50% Cu, 3.25% Pb, 35.25% Zn. This composition and the mill procedures used are designed to provide a rod which will fit the great majority of high-speed screw machine work.

*In special hard temper the tensile strength of small sizes will approach 90,000 psi.

ANACONDA®
FREE-CUTTING ROD
Anaconda American Brass Company

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, 50 lb ingots, 26.00, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 25.90; No. 43, 26.20; No. 195, 27.60; No. 214, 29.00; No. 356, 26.80, 50 lb ingots.

Antimony: R.M.M. brand, 95.5%, 32.50; Lone Star brand, 33.00, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 30.50-31.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $70.00 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $65 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 99+%, $1.50 per lb for 500-lb keg; $1.52 per lb for 100 lb case; $1.57 per lb under 100 lb.

Columbium: Powder, $55 per lb and up nom.

Copper: Electrolytic, 31.00 deld; custom smelters, 31.00 nom; lake, 31.00 deld; fire refined, 30.75 deld.

Germanium: First reduction, ingots, less than 1 kg 36.00-37.50 per gram; 1-10 kg 30.50-32.00 per gram; 10 kg or more, 28.10-29.99 per gram; intrinsic grade, under 10 kg 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-75 per troy oz nom.

Lead: Common, 10.80; chemical, 10.90; corroding, 10.90; St. Louis, New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 24 lb, $11 per lb deld; 24-90 lb, $9.50; 100-499 lb, $9.25; 450 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex., 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75 f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $193-197 per 76 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-8.5 in. diam., 50-4999 lb, $8.15 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, briquettes, sheets (4 x 4 in. and larger), unpacked, 81.25; 10-lb pigs, unpacked, 89.00; "XX" nickel shot, 88.75; "F" nickel shot for addition to cast iron, in kegs, 81.75; "F" nickel, 5 lb ingots, 82.75. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.09; Exton, Pa., basis, add 1.60. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel 77.50.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $6.50-7 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; 5 and 12 lb bricks, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom; sheet, $55 per lb nom.

Tellurium: $5.25 per lb, 100 lb or more.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 115.625.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 100-lb lots, $2.75 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00c; 99+% hydrogen reduced, $3.25.

Zinc: Prime Western, 11.50; brass special 11.70; intermediate, 11.70, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 12.35; special high grade, 12.50 deld. Diecasting alloy ingot No. 3, 13.75; No. 2, 14.25; No. 5, 14.00 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8-8.50 per lb; 100-500 lb, $7.25-7.50 per lb; 500-1000 lb, $6.50-7.25; over 1000 lb, $6.50 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 24.25-26.00; No. 12 foundry alloy (No. 2 grade), 21.75-22.25; 5% silicon alloy, 0.60 Cu max, 23.50-24.00; 13 alloy, 0.60 Cu max, 23.50-24.00; 195 alloy, 24.75-25.75; 108 alloy, 22.25-22.75. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.25; grade 2, 22.00; grade 3, 21.00; grade 4, 20.00.

Brass Ingot: Red brass, No. 115, 32.00; tin bronze, No. 225, 41.25; No. 245, 35.75; high leaded tin bronze, No. 305, 36.00; No. 1 yellow, No. 405, 27.50; manganese bronze, No. 421, 31.25.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.955, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.955, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 36.35; l.c.l., 36.98. Weatherproof 20,000-lb lots, 37.05; l.c.l., 37.80.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $16.50 per cwt; pipe, full coils, $16.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $6.75-15.50; sheared mill plate, $5.25-9.00; wire, $5.55-9.50; forging billets, $3.20-4.75; hot-rolled and forged bars, $3.80-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $14.00-25.00; H.R. strip, $14.00-22.90; C.R. strip, $16.00-35.00; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	147	126	145
Strip, C.R.	133	114	145
Plate, H.R.	134	116	133
Rod, Shapes, H.R.	116	95	116
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base f.o.b. customer custody.

Thickness Range (in.)	Width (in.)	Length Range (in.)	Price Range
0.250-0.136	24-72	72-180	45.40-48.00
0.136-0.096	24-72	72-180	45.90-48.80
0.096-0.077	24-72	72-180	46.40-50.30
0.077-0.068	24-72	72-180	46.90-52.10
0.068-0.061	24-72	72-180	46.90-55.00
0.061-0.048	24-72	72-180	47.40-57.70
0.048-0.038	24-72	72-180	47.90-60.50
0.038-0.030	24-72	72-180	48.40-65.30
0.030-0.024	24-72	72-180	48.90-67.20
0.024-0.019	24-60	72-180	49.40-59.90
0.019-0.017	24-48	72-144	50.30-57.00
0.017-0.015	24-48	72-144	51.20-58.00
0.015-0.014	24-36	72-144	52.30
0.014-0.012	24-36	72-144	53.50
0.012-0.011	24-36	72-144	54.60
0.011-0.0095	24-46	72-144	56.20
0.0095-0.0085	24-36	72-96	57.50
0.0085-0.0075	24-36	72-96	59.20
0.0075-0.007	24-36	72-96	60.80
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates and Circles: Thickness, 0.25-3 in.; width or diam. 24-60 in.; length, 72-240 in., mill finish.

Alloy	Plate Base	Circle Base
1100, 3003-F	44.60	50.90
5050-F	45.70	50.50
3004-F	46.70	52.40
5052-F	47.30	53.10
6061-T6	47.80	53.90
2024-T4*	51.80	58.90
7075-T6*	60.50	67.90

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 base, 12 ft lengths.

Diam (in.)*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	74.90	77.30	....	....
0.188	63.20	63.20	....	80.10
0.250	60.00	62.60	72.70	74.10
0.375	59.20	63.80	71.00	72.00
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	59.20	63.80	71.00	72.00
0.625	59.20	63.80	67.80	67.90
0.750	57.70	62.00	61.60	63.80
0.875	57.70	62.00	61.60	63.80
1.000	57.70	62.00	61.60	63.80
1.125	55.30	59.50	59.50	61.50
1.250	55.30	59.50	59.50	61.50
1.375	55.30	59.50	59.50	61.50
1.500	55.30	59.50	59.50	61.50
1.625	53.00	56.70	....	59.30
1.750	53.00	56.70	58.30	59.30
1.875	53.00	56.70	....	59.30
2.000	53.00	56.70	58.30	59.30
2.250	51.50	55.00	....	59.30
2.500	51.50	55.00	....	59.30
2.750	49.90	53.20	....	59.30
3.000	49.00	53.20	....	59.30
3.250	....	53.20	....	....
3.375	....	53.20	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random length, diam., 0.375-8 in., "F" temper; 2014, 47.50-57.60; 6061, 43.50-57.60; 7075, 61.80-71.90; 7079, 66.80-76.90.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 32.00; 1¼ in., 43.40; 1½ in., 51.80; 2 in., 62.60; 3 in., 124.95; 4 in., 171.80; 5 in., 233.15; 6 in., 308.55; 8 in., 464.35; 10 in., 716.25 (3-24 ft lengths).

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	45.30-46.80	54.00-60.00
15-17	45.30-46.80	56.50-61.80
18-23	45.80-47.50	58.60-67.00
24-32	45.80-47.50	66.80-81.50
33-38	49.50-52.20	85.10-96.60
39-44	59.80-63.60	102.00-124.00

MAGNESIUM

Sheets and Plates: AZ31B standard grades, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24.72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.00 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grades (AZ31B)
6-8	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 23.50-24.00; No. 2 heavy copper and wire, 22.75-23.25; light copper 20.00-20.50; No. 1 composition red brass, 20.50-21.00; No. 1

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES d (Based on copper at 31.00c)		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	56.13b	50.36–51.36	....	57.32	27.00	27.00	26.25
Yellow Brass	49.27	35.77c	49.56	53.43	20.375	19.50c	18.50c
Low Brass, 80%	52.15	52.09	52.44	56.21	22.875	22.625	22.125
Red Brass, 85%	53.17	53.11	53.46	57.23	23.875	23.625	23.125
Com. Bronze, 90%	54.73	54.67	55.02	58.54	24.75	24.50	24.00
Manganese Bronze	57.69	51.27	61.54	....	19.25	19.00	18.50
Muntz Metal	51.94	47.25	....	....	19.125	18.875	18.375
Naval Brass	53.94	47.75	60.25	58.10	19.00	18.75	18.25
Silicon Bronze	61.39	60.58	60.68	79.80	26.50	26.25	25.75
Nickel Silver, 10%	65.56	67.16	66.91	....	26.00	25.75	13.00
Phos. Bronze, A-5%	76.97	77.47	76.72	78.90	28.50	28.25	27.25

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Free cutting. d. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time of any or all kinds of scrap, add 1 cent per lb.

composition turnings, 19.50-20.00; new brass clipping, 18.00-18.50; light brass, 15.00-15.50; heavy yellow brass, 15.00-15.50; new brass rod ends, 17.00-17.50; auto radiators, unsweated, 16.50-17.00; cocks and faucets, 17.25-17.75; brass pipe, 17.50-18.00.

Lead: Soft scrap lead, 7.25-7.50; battery plates, 3.00-3.25; linotype and stereotype, 8.50-8.75; electrotype, 8.00-8.25; mixed babbitt, 10.00-10.50.

Monel: Clippings, 26.00-26.50; old sheets, 25.00-25.50; turnings, 18.50-19.00; rods, 25.00-25.50.

Nickel: Sheets and clips, 56.00-58.00; rolled anodes, 56.00-58.00; turnings, 53.00; rod ends, 56.00-58.00.

Zinc: Old zinc, 3.00-3.25; new diecast scrap, 3.00-3.50; old diecast scrap, 1.75-2.00.

Aluminum: Old castings and sheets, 8.50-9.00; clean borings and turnings, 4.00-4.50; segregated low copper clips, 10.75-11.25; segregated high copper clips, 9.75-10.25; mixed low copper clips, 10.25-10.75; mixed high copper clips, 9.75-10.25.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 9.50-10.00; clean borings and turnings, 7.00-7.50; segregated low copper clips, 14.50-15.00; segregated high copper clips, 13.00-13.50; mixed low copper clips, 12.50-13.00; mixed high copper clips, 12.00-12.50.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 10.50; clean borings and turnings, 8.50-9.00; segregated low copper clips, 13.50; segregated high copper clips, 13.00; mixed low copper clips, 13.00; mixed high copper clips, 12.50-13.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)
Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 57.00; light scrap, 52.00; turnings and borings, 37.00.

Copper and Brass: No. 1 heavy copper and wire, 28.25; No. 2 heavy copper and wire, 26.00; light copper, 23.75; refinery brass (60% copper) dry copper content, 24.75.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 28.00; No. 2 heavy copper and wire, 26.00; light copper, 23.75; No. 1 composition borings, 23.00; No. 1 composition solids, 23.50; heavy yellow brass solids, 18.00; yellow brass turnings, 15.50; radiators, 19.50.

Plating Material

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.60.

Copper: Flat-rolled, 47.50; oval, 44.50; electrodeposited, 37.50; cast, 42.50; 5000-10,000 lb quantities.

Nickel: Depolarized, less than 500 lb, 117.50; 500-1999 lb, 110.50; 2000-4999 lb, 107.00; 5000-29,999 lb, 106.00; 30,000 lb, 105.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 134.50; 200-499 lb, 133.00; 500-999 lb, 132.50; 1000 lb or more, 132.00.

Zinc: Balls, 18.25; flat tops, 18.25; flats, 21.00; ovals, 20.25, ton lots.

CHEMICALS

Cadmium Oxide: $1.60 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,000 lb, 61.90.

Copper Sulphate: 100-1900 lb, 15.50; 2000-5900 lb, 13.50; 6000-11,900 lb, 13.25; 12,000-22,900 lb, 13.00; 23,000 lb or more, 12.50.

Nickel-Chloride: 100 lb, 47.50; 200 lb, 45.50; 300 lb, 44.50; 400-4900 lb, 42.50; 500-9900 lb, 40.50; 10,000 lb or more, 39.50.

Nickel Sulphate: 5000-22,999 lb, 31.00; 23,000-39,900 lb, 30.50; 40,000 lb or more, 30.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-900 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 86.50; 100-600 lb, 76.80; 700-1900 lb, 74.10; 2000-9900 lb, 72.20; 10,000 lb or more, 70.90.

Stannous Chloride (Anhydrous): 100 lb, 144.80; 400 lb, 134.80; 800-19,900 lb, 113.50; 20,000 lb or more, 109.30.

Stannous Sulphate: Less than 50 lb, 152.20; 50 lb, 122.20; 100-1900 lb, 120.20; 2000 lb or more, 118.20.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page 105*)

half were 1,858,960 tons, up 24,315 tons from the total for the same period a year ago.

Order backlogs as of June 30 totaled 2,414,684 tons. Of that amount, 1,351,574 tons (56 per cent) are scheduled for fabrication within the four months ending Oct. 31.

Structural Shapes . . .

Structural Shape Prices, Page 94

Structurals are moving actively at most mills and service centers, but independent fabricators are not doing so well because of competition from mills and other independent shops.

Fabricating shops in New York City and on Long Island have been adversely affected by strikes. Construction work underway has been curtailed by strikes of concrete mix truck drivers, as well as by a shortage of structurals from strike-bound shops.

A leading fabricator in Los Angeles which usually averages a $2 million annual volume estimates sales for the first six months were off 10 per cent. Work backlog has dropped from 3½ months in June to three months or less in July.

Structural fabricating shops in New England expect difficulty in passing on higher labor costs. A new labor contract with Boston area shops adds up to about 12 cents an hour. The Boston agreement is applicable eventually to most other New England shops.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

6500 tons, plant, Aluminum Laboratories Inc., Oswego, N. Y., to Belmont Iron Works, Eddystone, Pa.

2430 tons, state highway, FICE 61-1 and FAVIVE 61-1, Queens County, New York, to American Bridge Div., U. S. Steel Corp., Pittsburgh.

1500 tons, boiler plant, National Bureau of Standards, Gaithersburg, Md., to Lehigh Structural Steel Co., Allentown, Pa.

1200 tons, department store, Bamberger's, Camden, N. J., to Belmont Iron Works, Eddystone, Pa., through William L. Blanchard Co., general contractor.

1145 tons, 71 transmission towers, Public Service Electric & Gas Co., for erection in Caldwell and Clifton, N. J., area, to Alcoa Products, Aluminum Co. of America, Pittsburgh.

900 tons, Robert Treat Hotel addition, Newark, N. J., through George F. Driscoll Co., New York, to Bethlehem Fabricators Inc., Bethlehem, Pa.

600 tons, plant in Pittsburgh area, International Paper Co., New York, to Pittsburgh Bridge & Iron Works, Pittsburgh.

600 tons, apparatus service shops, Cuyahoga Heights, Ohio, General Electric Co., Schenectady, N. Y., to Burger Iron Works, Akron, Ohio.

565 tons, Hancock Airport Terminal, Syracuse, N. Y., to City Iron Works, Hartford, Conn.

350 tons, plant and office building addition, Auburn, N. Y., General Electric Co., to Bethlehem Fabricators Inc., Bethlehem, Pa.

346 tons, four 3-span and two 1-span composite wide flange beam bridges, Shelburne connection, Interstate Route 189, Burlington-South Burlington, Vt., I-189-3(11), to City Iron Works, Hartford, Conn.; Lane Construction Corp., Meriden, Conn., general contractor; also 283 tons, concrete reinforcing bars and 12,670 linear feet steel piles.

330 tons, two 3-span and one 1-span composite wide flange beam bridges, Interstate Route 89, South Burlington, Vt., I-89-3(14) contract 2, to City Iron Works, Hartford, Conn.; Lane Construction Corp., Meriden, Conn., general contractor.

275 tons, department store and supermarket, Nanuet, N. Y., through Arlen Operating Co., to Kurtz Iron Works.

245 tons, Route 221, Sec. 14B, Union County, New Jersey, to Irvington Steel & Iron Co., Irvington, N. J.

224 tons, state highway development, FARC 61-57, Essex County, New York, to Goodwin-McDowell.

186 tons, three 1-span composite wide flange beam bridges, Williston-South Burlington, Vt., to City Iron Works, Hartford, Conn., I-89-3 (14) contract 1; Lane Construction Corp., Meriden, Conn., general contractor.

130 tons, chapel, Manhattanville College of the Sacred Heart, Purchase, N. Y., to Mineola Steel Fabricators, Long Island, through George A. Fuller Co., New York.

CLASSIFIED

Representatives Wanted

FOUNDRY REPRESENTATIVE FOR NEW YORK CITY

Old Established Foundry desires manufacturer's representative with noncompetitive lines to sell steel castings produced to all specifications; Meehanite Metal, all types; Ductile Irons; Ni-Resist, and Ni-Hard Irons.

Must have man familiar with foundry practice and experienced in castings sales. Foundry now has several established New York customers.

Submit resume for confidential handling to:

Box 950, STEEL
Penton Bldg. Cleveland 13, Ohio

Machinery For Sale

Giant Horiz. BORING MILL
18" dia. Spindle, 13' Vert. & 30' Horiz. Travel
100 to 4000 T PRESSES
Unused & little used U. S. Govt. surplus machy. Mfgd. as late as 1955. Sacrifice before removal.
WENDER PRESSES, INC.
1957F Clay, Detroit 11, TR 2-1270

Positions Wanted

ELECTRIC FURNACE STEEL MELTER, 26 years experience in melting of stainless; aircraft, forging, and commercial steels; mold and ladle preparation; and casting ingots from 1,000 pounds to 100,000 pounds. Reply Box 947, STEEL, Penton Bldg., Cleveland 13, Ohio.

SALES ENGINEER—25 years experience calling on steel plants, foundries, and metalworking companies, on commission basis. Reply Box 948, STEEL, Penton Bldg., Cleveland 13, Ohio.

MANAGER OR SUPERINTENDENT of a forging plant. Over 20 years experience. Broad knowledge of all operations including maintenance. Reply Box 949, STEEL, Penton Bldg., Cleveland 13, Ohio.

The photomicrograph above, made from an etched .009" cross section of a new composite stainless alloy and phosphor bronze wire, was one of Fort Wayne Metals most closely guarded secrets since 1957; and well it might have been.

Used in Fourdrinier paper machine wire screen belts up to 200 feet long and as wide as a two lane highway, it is responsible for a major cost reduction in the multi-billion dollar paper industry.

Paper makers (many running their block-long Fourdriniers 24 hours a day) who once had four-hour shutdowns every week from wire failure—at a cost up to $1,000 an hour—now run as long as a month or more without wire trouble, even 102 days under special conditions. FWM's Drawn Brazed Strand ("DBS") provides the extra fatigue life and better chemical resistance required to bring about this saving.

"DBS" can be produced in a composite of many different types of alloys for diversified uses, including physical, thermal, chemical, magnetic, electronic and electrical applications. "DBS" may prove to be an important development in many products where high fatigue resistance, light weight, chemical inertness, controlled conductivity or combinations of these characteristics are required.

"DBS" development is typical of the ideas in precision alloy wire you can expect from FWM. We will be glad to forward "DBS" data on request.

PRECISION FINE WIRE
STAINLESS AND OTHER ALLOYS
FWM
FORT WAYNE METALS, INC.
3211 MacARTHUR DRIVE
FORT WAYNE, INDIANA

SEND FOR "FWM" IDEA FOLDERS

FORT WAYNE METALS, INC.
3211 MacARTHUR DRIVE
FORT WAYNE, INDIANA

100 tons, cable dock enclosures, Western Electric Co., Chicago, to Wendnagel Co. Inc., that city.

STRUCTURAL STEEL PENDING

32,250 tons, superstructure, Sunshine Toll Bridge, Mississippi River, Ascension-St. James Bridge & Ferry Authority, Donaldson, La.; American Bridge Div., U. S. Steel Corp., Pittsburgh, low.

15,000 tons, Beacon-Newburgh bridge superstructure, New York State Bridge Authority, Poughkeepsie, N. Y.; bids July 27.

12,000 tons, state expressway along Northern Boulevard, Queens, New York; bids Aug. 10.

12,000 tons, section of state Gowanus Parkway, New York; bids Aug. 10.

2500 tons, office, Spring Cotton Mills, New York, George A. Fuller Co., New York, contractor; bids closed.

1680 tons, state bridgework FAHRD 61-1, New York County, New York; bids July 27.

1580 tons, state highway project Route 80, Sec. 5N, Bergen County, New Jersey; Franklin Contracting Co. low on general contract.

1183 tons, state highway work, Route 287, Sec. 3-B, Middlesex County, New Jersey; bids Aug. 11; also 422 tons of reinforcing bars required.

853 tons, angles, Grade M, Military Industrial Supply, Navy, Philadelphia; bids July 31; shipment to various destinations.

750 tons, special assembly building, Cape Canaveral, Fla.; Paul Smith Construction Co. of that state low on general contract.

684 tons, state bridgework, FAHRD 61-1, New York County, New York; bids July 27.

600 tons, headquarters building, National Maritime Union, 13th Street and Seventh Avenue, New York; bids closed.

500 tons, warehouse and office, North Brunswick, N. J., General Motors Corp.; Fred J. Brotherton low on general contract.

400 tons, manufacturing building, Sarco Mfg. Corp., Allentown, Pa.; Walter Kidde Constructors Inc., designer and engineer.

290 tons, air traffic control center, MacArthur Field, Islip, N. Y.; Acme Missile & Facility, Long Island, low bidder.

251 tons, state bridgework, Jefferson County, Pennsylvania; bids Aug. 11; also 378 tons of reinforcing bars required. Highway program in this county will also require several prestressed concrete superstructures.

190 tons, office and warehouse, A.D.F.A. Inc., Rockleigh, N. J.; Engineers Inc., general contractor.

131 tons, state highway bridge, FARC 61-95, Jefferson County, New York; bids July 27.

100 tons, Center Avenue Bridge, Ft. Lee, N. J., for the Port of New York Authority; bids asked.

REINFORCING BARS . . .

REINFORCING BARS PENDING

422 tons, state highway work, Route 287, Sec. 3-B, Middlesex County, New Jersey; bids Aug. 11; also 1183 tons of shapes required.

378 tons, state bridgework, Jefferson County, Pennsylvania; bids Aug. 11; 251 tons of shapes will also be required.

175 tons, Washington state box girder span, Yakima County; Sound Sand & Gravel Co., Port Orchard, Wash., low $127,508.

150 tons, Seattle Pacific College dormitory and dining hall; George E. Teufel Co., Seattle, low on combined tender, $1,268,461.

135 tons, Washington state Cedar River bridge, King County; Bergerson & Roberts and Earley Construction Co., Tacoma, Wash., joint low at $114,470.

105 tons (also 40 tons shapes), Washington state box girder bridge, Whatcom County; Lockyear & White Inc., Longview, Wash., low $193,459.

100 tons or more, five state bridges, Alaska, total length, 783 ft; M-B Contracting Co., Seattle, low $875,019.

PLATES . . .

PLATES PLACED

1027 tons, carbon, Navy Purchasing Office, Washington, to Phoenix Steel Corp., Claymont, Del.

1000 tons, fabricating building, Tonawanda,

N. Y., to Buffalo Structural Steel Corp., Buffalo.

250 tons, one cone roof tank, Mobil Oil Co. Inc., Elmira, N. Y., to an unnamed fabricator.

225 tons, one cone roof tank, Melton, N. Y., to Fisher Tank Co., Chester, Pa.

100 tons or more, elevated water storage tank, veterans' hospital, Montrose, N. Y., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

100 tons or more, wrought homogeneous, Ordnance Dept., Aberdeen, Md., to U. S. Steel Corp., Pittsburgh, $247,495.

Unstated tonnage, resurfacing Hackensack River bridge, Secaucus, N. J., to Phoenix Bridge Co., Phoenixville, Pa.

100 tons or more, jet fuel tank, Williams AFB, Arizona, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

PLATES PENDING

211 tons, high tensile, Military Industrial Supply, Navy, Philadelphia; bids July 31.

108 tons, Grade M, Type I, Navy Purchasing Office, Washington; delivery to New York Naval shipyard, Brooklyn, N. Y.

PIPE . . .

CAST IRON PIPE PLACED

500 tons or more, 24,660 ft 12 in. supply mains, for Cold Beach, Oreg., to the U. S. Pipe & Foundry Co., Portland, Oreg.

450 tons, 4 to 12 in., for Seattle improvement district, to Pacific States Cast Iron Pipe Co., Seattle.

150 tons, 3700 ft, 12 in., for Tacoma improvement, to Pacific States Cast Iron Pipe Co., Seattle.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Chicago, Rock Island & Pacific, ten, 1800 hp road switchers, to Electro-Motive Div., LaGrange, Ill., General Motors Corp.

Union Pacific, 11 diesel-electric freight locomotive units; four 2400 hp units to Alco Products Inc., Schenectady, N. Y., four 2500 hp units to General Electric Co., Schenectady, and three 2400 hp units to Electro-Motive Div., LaGrange, Ill., General Motors Corp.

RAILROAD CARS PLACED

Gulf, Mobile & Ohio, 475 freight cars to Pullman Inc., Chicago, four hundred, 50 ft boxcars to be built at the Bessemer, Ala., plant, and 75 cover hopper cars at the Butler, Pa., plant. Work on the cars starts Aug. 14. They will cost $4,500,000.

Union Pacific, 35 postal storage cars and 10 baggage cars, to St. Louis Car Co., subsidiary of General Steel Industries Inc. Cars will be built at North St. Louis, Mo., with deliveries scheduled to begin in the second quarter of 1962.

American Refrigeration Transit Co., ten 50 ton, steel sheathed refrigeration cars, to Pacific Car & Foundry Co., Renton, Wash.

Northern Pacific, fifty, 50 ft, mechanical refrigerator cars, to Pacific Car & Foundry Co., Renton, Wash.

Brazilian Federal Railway System, 18 passenger cars, to the Berwick, Pa., plant of ACF Industries Inc., New York.

Wabash, 515 roller bearing equipped freight cars, 50 ton capacity, to American Car & Foundry Div., ACF Industries Inc., New York. Cost: $4,750,000.

New York City Transit Authority, 236 subway cars, to St. Louis Car Co., subsidiary of General Steel Industries Inc., St. Louis.

RAILROAD CARS PENDING

New York City Transit Authority, 1580 subway cars proposed in capital budget for 1962. The budget is subject to approval by Board of Estimates. St. Louis Car Co., subsidiary of General Steel Industries Inc., is reported low bidder on 220 subway cars figured under current budget.

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Coming Aug. 7 IN STEEL

Saline Water Conversion: Giant Industry Aborning?

"Fresh water shortages in the U. S. will be severe enough to make the conversion of salt water a major commercial venture within 15 or 20 years." So predicts the House Committee on Science and Astronautics.

Next week, STEEL examines the market opportunities, including one estimate that within 15 years, $10 billion to $20 billion will have to be spent on new conversion plants.

WILL YOUR BUSINESS THRIVE ON THE CORNER OF MAIN & MAPLE?

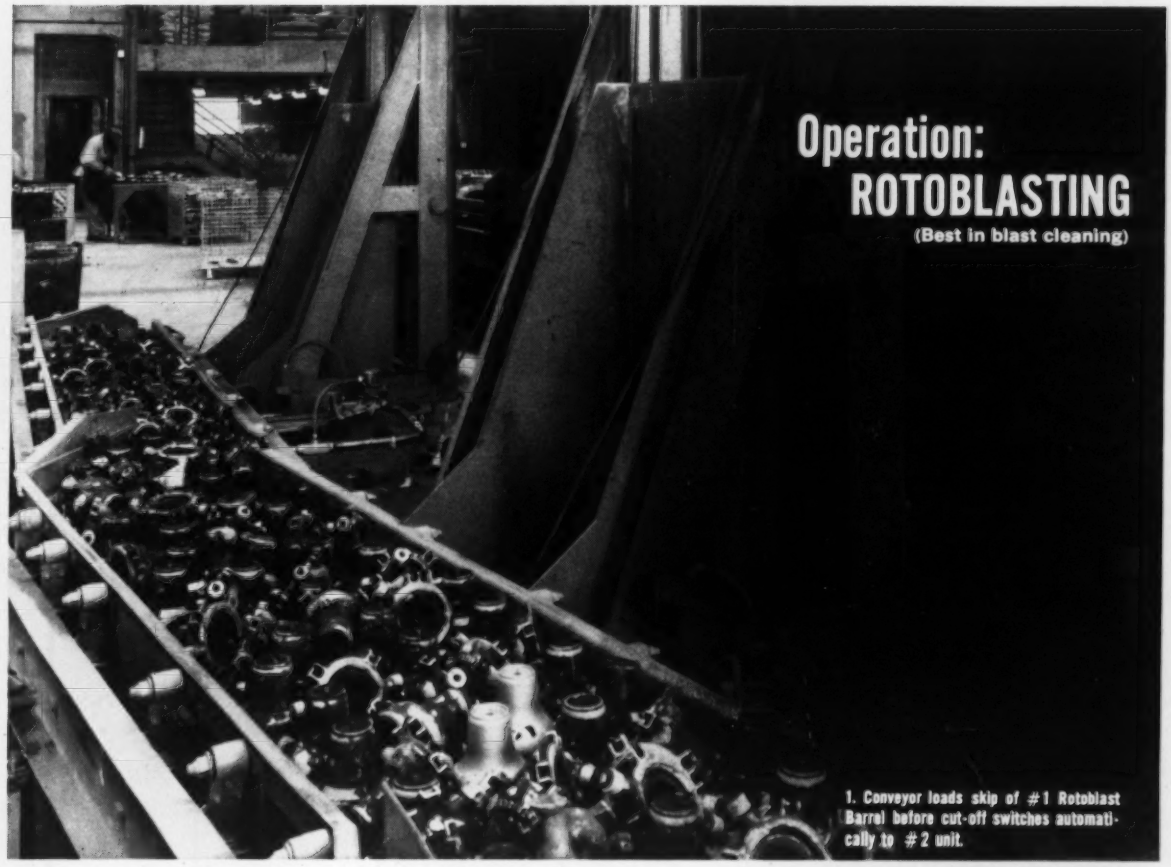
Our population isn't all that's growing. Needs are. Markets are. And so are towns and cities in the path of our growing economy. Here's how to bring the business your way, how to put your corner in the mainstream of a growing America.

Take a look around your corner, even to the outlying areas of town. Surely you'll see room for development, for new industries that create new jobs and bring in new customers. The development of your community will make more room for your youngsters to grow, find jobs, careers and a future — not far from Main & Maple.

And there's no time like the present to begin. If your town is looking for new industry, your Department of Commerce can help. Field experts will show how to evaluate what you have to offer, and how to present it to the best prospects. (If you're a businessman with expanding ideas, they'll direct you to suitable locations.)

Take advantage of the many ways in which your business can grow. In attracting new industry to your local community. In new domestic markets. In the lucrative foreign markets. In developing new products and services. Just write or phone the U. S. Department of Commerce Office of Field Services in your city, or Washington 25, D.C. Your U.S. Department of Commerce is always ready to help you grow with America!

NOW'S THE TIME TO GET GROWING IN A GROWING AMERICA!



1. Conveyor loads skip of #1 Rotoblast Barrel before cut-off switches automatically to #2 unit.

Complete automation in blast cleaning!

Pangborn Rotoblast removes heavy sand cores and cleans up to 45,000 castings per shift at Neptune Meter!

A new and *completely automatic* Rotoblast operation not only cleans castings in half the time, but a new special separation removes heavy sand cores as well at Neptune Meter Co., Long Island City. The world's largest exclusive manufacturer of meters for liquids, Neptune can now handle 45,000 castings from the molds each shift . . . with just two automated Rotoblast Barrels.

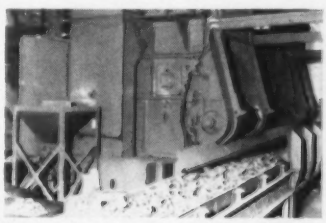
No costly or time-consuming manual lifting, toting or weighing here! Once the button is pressed, the Rotoblast sequence starts and recycles automatically until stopped at the end of the shift!

Whether your installation features automation or batch cleaning, Rotoblast cleaning efficiency can cut *your* operating and manpower costs. Flexibility of installation, ease of maintenance, durable construction—all contribute to lower overall cleaning costs.

Write PANGBORN CORPORATION, 1600 Pangborn Blvd., Hagerstown, Md., Pangborn Canada, Ltd., 47 Shaft Road, Toronto (Rexdale), Canada; or phone district office in Yellow Pages, "Sand Blast Equipment." *Manufacturers of Blast Cleaning, Vibratory Finishing, Dust and Fume Control Equipment—Rotoblast® Steel Shot and Grit®.*

Pangborn
OF HAGERSTOWN

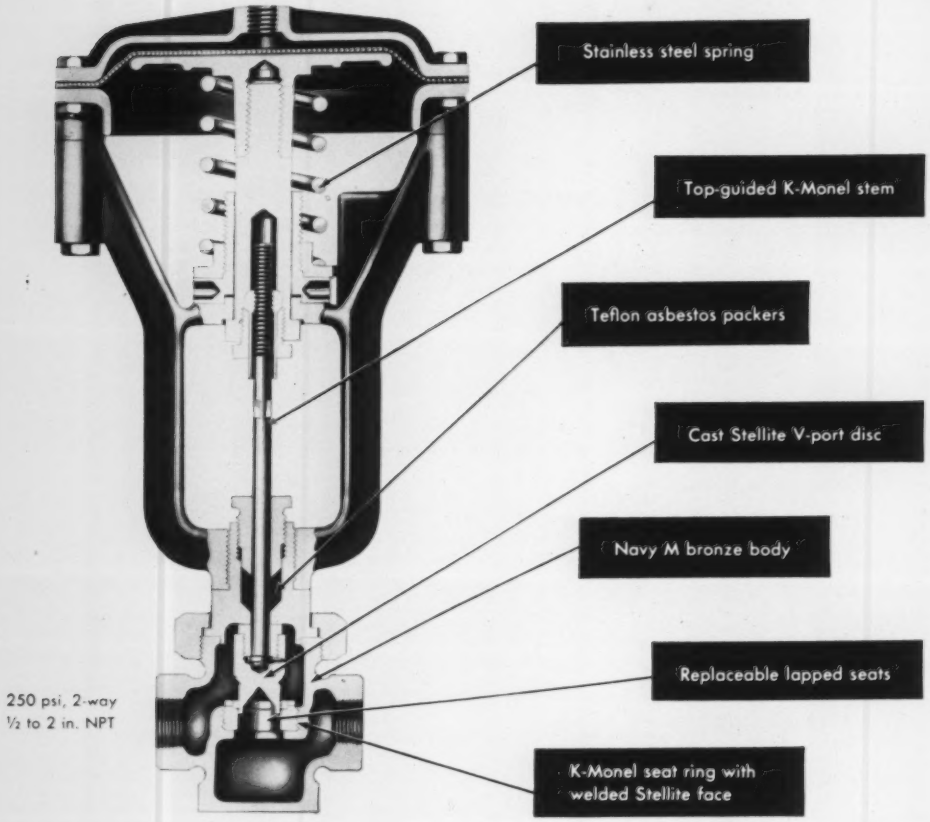
2. Skip fills second unit with exact pre-determined load for cleaning.



3. Cleaned castings move on take-away conveyor to next operation.

4. Before and after Rotoblasting. Note core sand and rods in uncleaned piece.

SINCLAIR-COLLINS® V-PORT VALVES



. . . for precise control of pressure or temperature

. . . steam, hot or cold

raw water service

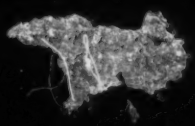
Sinclair-Collins' V-port valves offer a solution to your temperature or pressure modulation problems. Designed for instrument actuation, they offer variable metering to provide extremely accurate and consistent control of media flow rates. Highest quality materials and Sinclair-Collins' precision manufacturing methods assure long, reliable service life, with minimum maintenance downtime. Stainless steel trim resists corrosion . . . Stellited seat ring and port disc resists wire drawing and cutting. Find out how S-C V-port valves can meet your control needs . . . a call to your near-by Sinclair-Collins Field engineer will bring prompt application engineering recommendations.

For more information write for free Bulletin SC-59. Address: Sinclair-Collins Valve Company, Akron 9, Ohio, Dept. ST-761.

The SINCLAIR-COLLINS VALVE Co.

DIVISION OF INTERNATIONAL BASIC ECONOMY CORPORATION (IBEC)
AKRON 11, OHIO

8117



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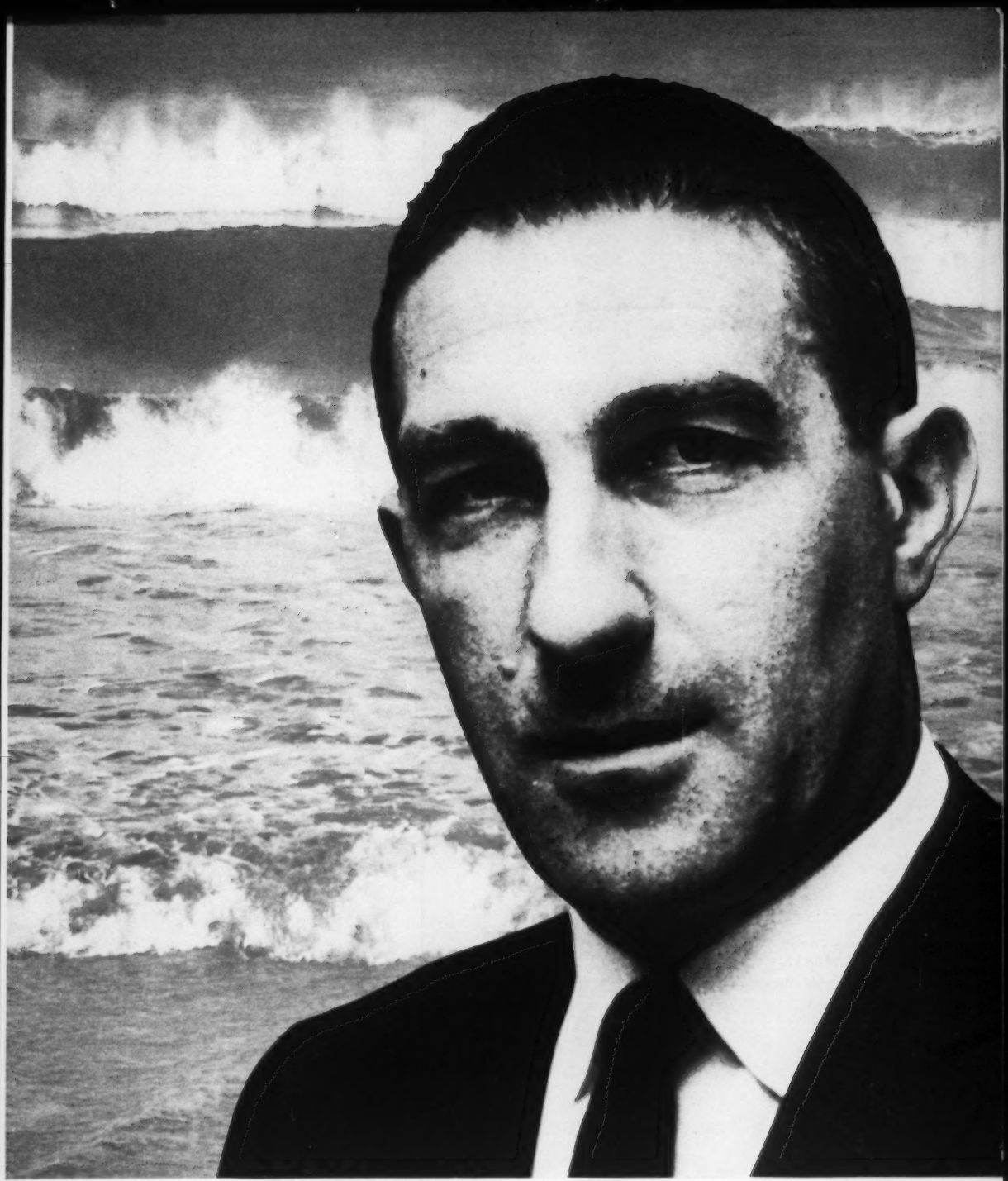
AUGUST 7, 1961



Interior Secretary Udall plays key role in birth of giant market . . .

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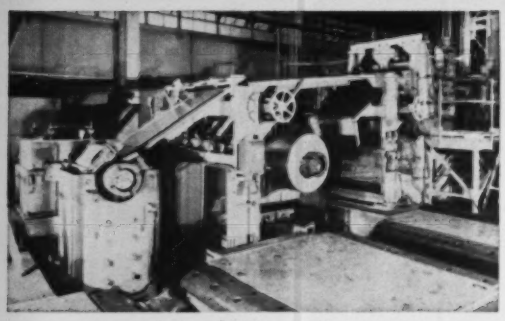
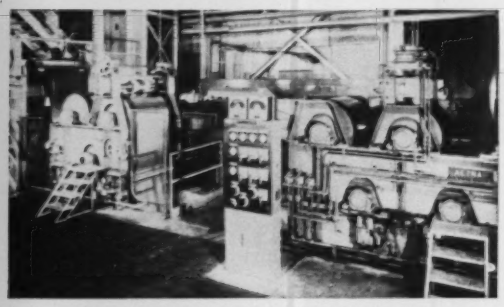
Continuous Annealing and Surface Treatment Lines have a lot in common

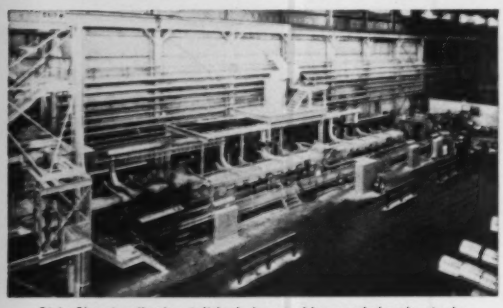


Delivery end shows recoiling.

Entry Section with uncoiling and scrap handling.



Multiple Bridle Rolls help maintain constant tension.



Strip Cleaning (horizontal) includes scrubbers and cleaning tanks

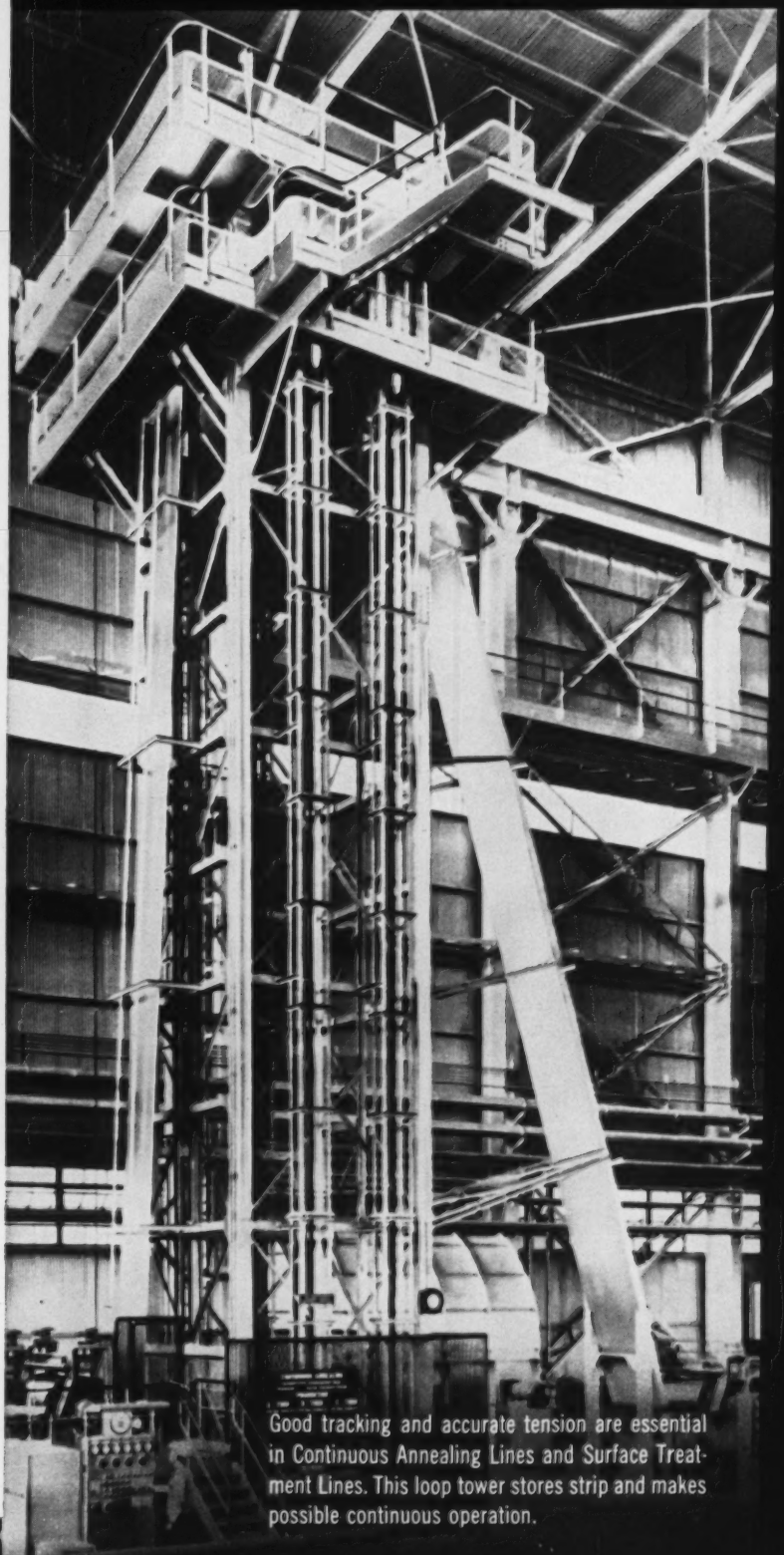
BLAW-KNOX

Aetna-Standard Division

BLAW-KNOX

300 Sixth Avenue, Pittsburgh 22, Pennsylvania

Blaw-Knox designs and manufactures for America's growth industries: METALS: Rolling Mills • Steel Processing Lines • Rolls • Castings • Open Hearth Specialties • PROCESSING: Process Design, Engineering and Plant Construction Services • Process Equipment and Pressure Piping • CONSTRUCTION: Concrete and Bituminous Paving Machines • Concrete Batching Plants and Forms Gratings • AEROSPACE: Fixed and Steerable Antennas • Radio Telescopes Towers and Special Structures • POWER: Power Plant Specialties and Valves



Good tracking and accurate tension are essential in Continuous Annealing Lines and Surface Treatment Lines. This loop tower stores strip and makes possible continuous operation.

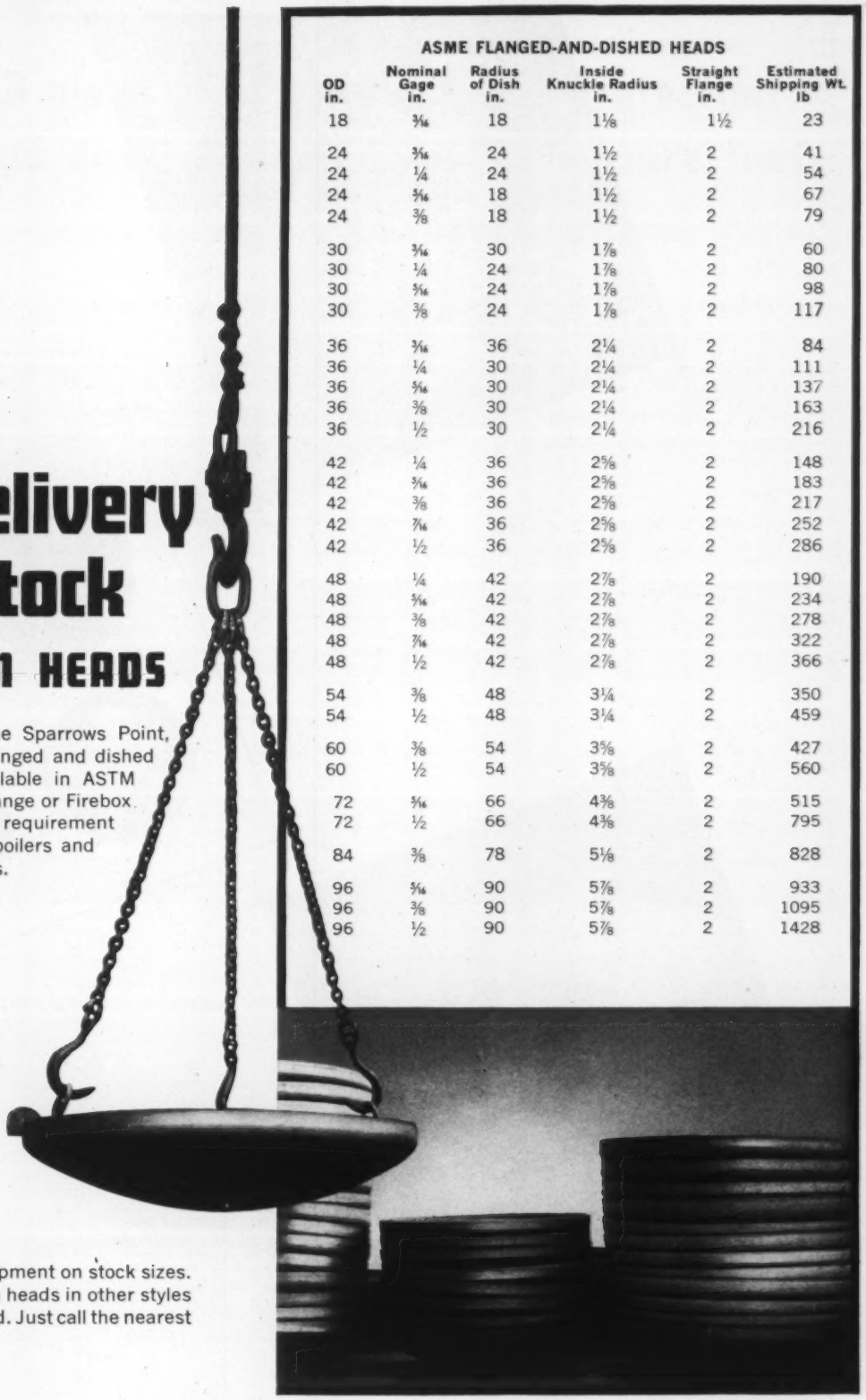
Fast delivery from stock

BETHLEHEM HEADS

Bethlehem stocks at the Sparrows Point, Md., Plant, all of the flanged and dished heads listed here. Available in ASTM Spec. A-285, Grade C Flange or Firebox steel, they meet every requirement of the ASME Code for boilers and unfired pressure vessels.

ASME FLANGED-AND-DISHED HEADS

OD in.	Nominal Gage in.	Radius of Dish in.	Inside Knuckle Radius in.	Straight Flange in.	Estimated Shipping Wt. lb
18	3/16	18	1 1/8	1 1/2	23
24	3/16	24	1 1/2	2	41
24	1/4	24	1 1/2	2	54
24	5/16	18	1 1/2	2	67
24	3/8	18	1 1/2	2	79
30	3/16	30	1 7/8	2	60
30	1/4	24	1 7/8	2	80
30	5/16	24	1 7/8	2	98
30	3/8	24	1 7/8	2	117
36	3/16	36	2 1/4	2	84
36	1/4	30	2 1/4	2	111
36	5/16	30	2 1/4	2	137
36	3/8	30	2 1/4	2	163
36	1/2	30	2 1/4	2	216
42	1/4	36	2 5/8	2	148
42	5/16	36	2 5/8	2	183
42	3/8	36	2 5/8	2	217
42	7/16	36	2 5/8	2	252
42	1/2	36	2 5/8	2	286
48	1/4	42	2 7/8	2	190
48	5/16	42	2 7/8	2	234
48	3/8	42	2 7/8	2	278
48	7/16	42	2 7/8	2	322
48	1/2	42	2 7/8	2	366
54	3/8	48	3 1/4	2	350
54	1/2	48	3 1/4	2	459
60	3/8	54	3 5/8	2	427
60	1/2	54	3 5/8	2	560
72	5/16	66	4 3/8	2	515
72	1/2	66	4 3/8	2	795
84	3/8	78	5 1/8	2	828
96	5/16	90	5 7/8	2	933
96	3/8	90	5 7/8	2	1095
96	1/2	90	5 7/8	2	1428



Steel

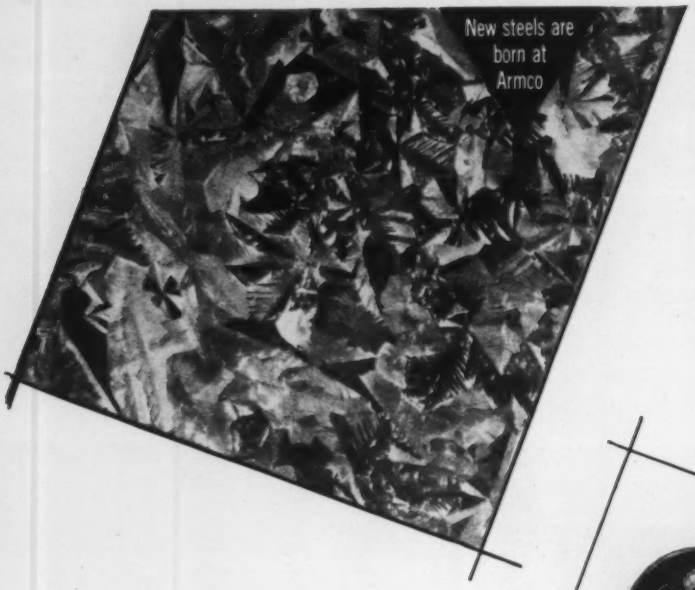
for Strength
. . . Economy
. . . Versatility

We can make prompt shipment on stock sizes. And we'd like to quote on heads in other styles and sizes than those listed. Just call the nearest Bethlehem sales office.

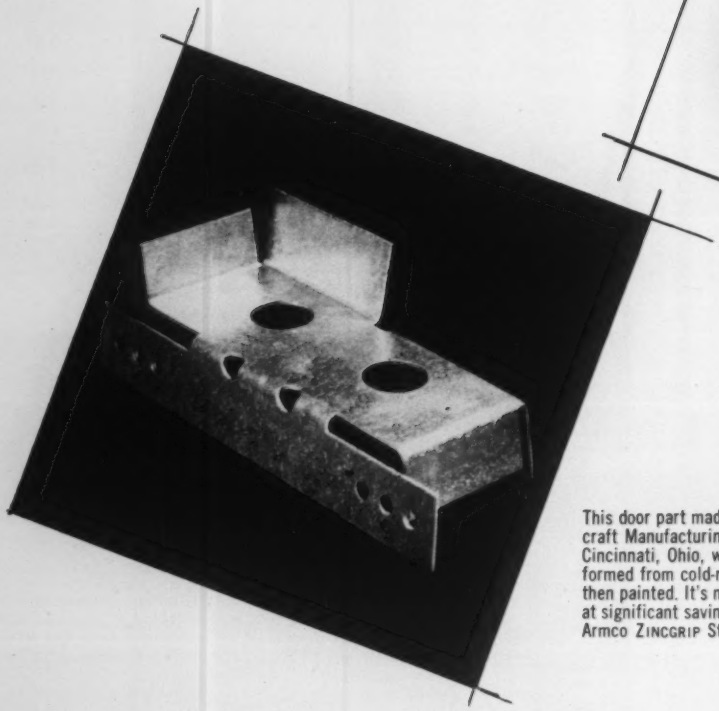
BETHLEHEM STEEL COMPANY, BETHLEHEM, PA. Export Sales: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL



Coating on



This door part made by Steelcraft Manufacturing Company, Cincinnati, Ohio, was previously formed from cold-rolled steel, then painted. It's now fabricated, at significant savings, from Armco ZINCGRIP Steel.

ZINCGRIP gives products durable protection at average cost of about 2⅓¢ per square foot

Can you match this with painting or plating?

Unseen structural parts are often protected from corrosion by painting or plating cold-rolled or hot-rolled steel. Yet with Armco ZINCGRIP® Steel, you can give your products the durable protection of a full-weight two-side coating of zinc at an *average cost of about 2⅓ cents per square foot.* Important cost savings are realized daily by manufacturers who take advantage of this economical protection.

Severe fabrication is no obstacle. You can work mill-coated ZINCGRIP to the limit of its ductile steel base. The tight zinc coating will not flake or peel.

If you paint or plate for protection from corrosion, it will pay you to investigate Armco ZINCGRIP Steel. Let us help you compare your costs for a painted or plated steel part with costs for the same part made from durable ZINCGRIP. Just fill in and mail the coupon.

Armco Division • Armco Steel Corporation
1171 Curtis Street, Middletown, Ohio
So that I can check savings with Armco ZINCGRIP—
☐ Send me your Application Data Bulletin
☐ Have an Armco Representative call

Name_____ Title_____

Firm_____

Street_____

City_____ Zone_____ State_____

Steel

Use this label to identify your products made of strong, durable steel.

Check these cost comparisons

Steel Thickness	Cost of* ZINCGRIP Coating c/sq. ft. of sheet	Typical** Cost of Painting c/sq. ft. of sheet	Savings with ZINCGRIP c/sq. ft.
.025	1.83c	3.25c	1.42c
.050	2.72	3.25	.53
.075	2.51	3.25	.74
Average . . .	2.35c	3.25c	.90c

*Coated both sides **Painted both sides

Computations based on coils 24" to 36" wide. ZINCGRIP coating costs are additional costs beyond price of cold-rolled steel. Due to variations between thicknesses, cost of zinc coating in table varies somewhat even though it's the same full-weight coating. Paint costs are figured on typical dip-painting or flow-coating methods and include cost of metal preparation, paint, labor and overhead of painting operations. Some paint costs are lower than these; many are more.

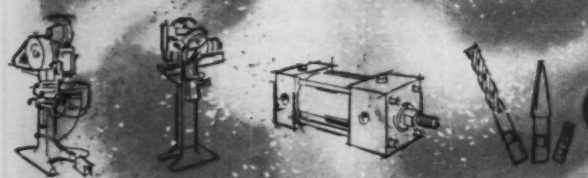
ARMCO **Armco Division**

Along with outer space . . .

the T-J Spacemaker is still making

BIG NEWS

The T-J Spacemaker cylinder line is not now, nor ever has been, a probe into outer space. It is offered as a practically designed, research engineered and time tested product. Its Spacemaker feature (no tie-rods) and rugged construction gives greater strength, saves space and reduces costs in all power-drive applications. The Spacemaker is available in a complete range of bore sizes and strokes, air or hydraulic, and contains many *plus features* and extras as STANDARD . . . NO EXTRA COST! Write Tomkins-Johnson, 2425 W. Michigan Ave., Jackson, Mich. for Bulletin #155-4 and for full particulars, today.



RIVITORS CLINCHORS CYLINDERS CUTTING TOOLS

T-J TOMKINS-JOHNSON
JACKSON MICHIGAN

Giant Tale

Secretary of Interior Stewart L. Udall, right, is telling Associate Editor George Howick that the "nation faces water problems . . . that could conceivably restrict economic growth." To learn about America's giant progress in salt water conversion, see Page 41.

Besides writing articles on water conversion and many other subjects, George also authors the Metalworking Week section (Page 17) and contributes to the Program for Management Series. He joined STEEL in 1957, after attending Bowling Green State University (Ohio).

Contact

The adding machines are quiet now. They have finished their job, so we can report:

In the first half of 1961, our 33 editors and 13 correspondents traveled 250,000 miles on STEEL's editorial business.

They made 23,000 contacts (with about 15,000 people) via 10,850 letters, 9100 phone calls, and 3050 personal visits.

Of course, those figures don't include the weekly meetings STEEL editors hope they're having with all 207,000 of you through the editorial pages.

Incidental Intelligence

Geraldine, our cleaning woman and night editor, passes on these gleanings from the editors' waste baskets:

Item: National Eye Research Foundation says 500,000 American women are wearing contact lenses to change the color of their eyes. Forty per cent are shifting to blue.

Item: Molehill, W. Va., has changed its name to Mountain.

Item: There are only three major types of whiskey, each produced only in the country of its origin—American Bourbon, Scotch, and Canadian. Although little bourbon is exported, it outsells all other types combined because of the immensity of the U. S. market. Scotch outsells all others combined in the global market; its exports are 3 times its domestic sales. Canadian has two large markets—Canada and the U. S.

Item: A book publisher received an order from a prison's library for "Climbing the Executive Ladder" and "Fun on Wheels."

Item: These communities are in Florida—Romeo, Juliet, Hen Scratch, Two Eggs, Picnic, and Sopchoppy.

Sardonic Mottos

Here are some more that may be new to you:

"A man owes it to himself to become a success —once successful, he owes it to internal revenue."—submitted by John Grissom, Welex Div., Houston, Halliburton Co.

"Before you ask, the answer is no."—submitted by Arthur Schoeni of Chance Vought Corp., Dallas.

Answer

Last week we asked what IITYWYBMAD stood for. So many have replied correctly that space limitations make it impossible to list you all.

The answer: If I Tell You, Will You Buy Me A Drink?

Meet with Success

Is that meeting necessary? Associate Editor Reed Trask explores the question on Page 34. Only 10 per cent of industry's meetings are particularly effective. He gives tips on how to improve the percentage.

A graduate of Ohio State University, Reed has several years' experience writing labor, finance, and technical articles for the Cleveland *Plain Dealer* and the Cleveland Electric Illuminating Co. He has been with us since June, 1960, now operating out of New York City to cover that metropolitan area, plus eastern Pennsylvania.

STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $30 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.

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Cool Comfort for men who work in Hot Places

Available in 24", 30" and 36" sizes.

Your men can work better, faster and longer when air is re-circulated and cooled by these ruggedly built portable giant fans.

Write today for complete information

B. F. PERKINS & SONS, INC.
HOLYOKE • MASS.

You spent $450,000,000 on bowling last year

13½ times as much as you gave to fight cancer

Shocking? Yes. And here's another shocking fact: in 1961, cancer will strike in approximately two out of three homes.

Go bowling. It's fun. Enjoy yourself. But when you spend fifty cents to knock down pins—give as much to the American Cancer Society—*to knock out cancer.*

If you do that, you will be giving $450,000,000 to fight cancer this year. *Thirteen and a half times as much as last year!* Fight cancer with a checkup—and a check to the **American Cancer Society.**

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Fluid Power news

OILGEAR 40 Years of Fluid Power

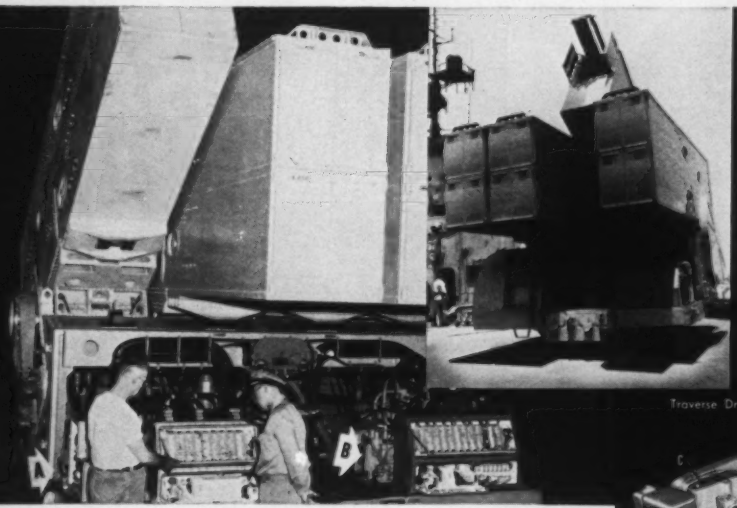
Report No. 11,400 From Oilgear *Application-Engineering* Files

HOW OILGEAR ELECTROHYDRAULIC SERVO-VALVE-CONTROLLED DRIVES AIM *ASROC** MISSILE LAUNCHERS IN RESPONSE TO LOW-POWER SIGNALS FROM SHIPBOARD DIGITAL COMPUTERS.

**ASROC (Anti-Submarine ROCket) — the Navy's deadliest, integrated, anti-submarine weapons system — consists of 4 major parts: an underwater sonar detection device; an electronic, digital, firecontrol (aiming) computer; a "pepper-box" type, 8-missile launcher; and ASROC missiles. Within seconds after sonar detection of a hostile submarine, the computer charts its course, speed, and range — correlated with the ASROC-equipped ship's course, speed, and roll. The resultant computer signals command the launcher to traverse and elevate instantly to accurate "aim" position, and continue to "track" from subsequent computer command signals. The ship commander merely pushes a button to fire either rocket-propelled, homing torpedos or depth charges.*

PROBLEM: Power and control for both the traverse and elevation drive systems to "aim" ASROC missile launchers in response to direct, low-power, electrical command signals from a digital firecontrol computer.

REQUIREMENTS: 1. High traverse and elevation speeds in either direction, with shockless reversal, to bring launcher "on target" — rapidly. 2. Fast, accurate control response for high-speed "homing." 3. Precisely controlled, low variable speeds for "tracking." 4. Entire drive and control systems to occupy a minimum of space within the launcher base. 5. Dependability — "no time-out permitted" — a rigid requirement for fleet use. 6. Unitized assemblies preferred, to facilitate installation and replacement.

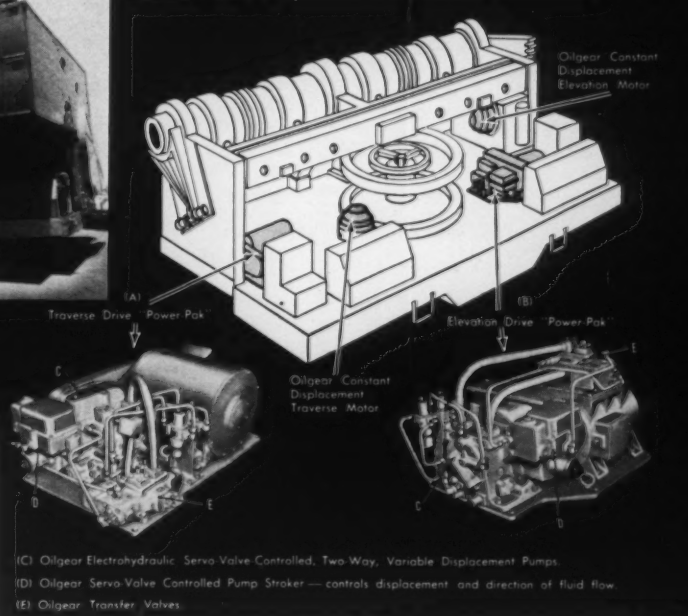


Official Photos — U.S. Navy. Actual launcher performance data is classified information.

ABOVE: ASROC missile launcher being checked at U.S. Naval Ordnance Plant, York, Pennsylvania. Arrows indicate traverse (A) and elevation (B) Power-Paks. **INSET:** ASROC launcher ready to fire aboard U.S.S. Norfolk. Each of the 8 cells serve as missile stowage magazines and launchers — all traverse as a unit . . . each over/under pair of cells elevate individually. 360° launcher traverse is possible, but a quadrant is blocked to protect ship's superstructure. Missiles weigh about 1,000 lbs., are about 15 ft long. Launcher base sketch, right, approximates position of Oilgear Drives.

SOLUTION: With Oilgear's experience in meeting the speed, control, and precise turret and gun performance requirements for U.S. Army tanks, howitzers, and anti-aircraft guns — this missile launcher application was a "natural" for Oilgear *ANY-SPEED* Drives — and the alert, accurate response of Oilgear's Electrohydraulic Servo-Valve-Controlled, Two-Way, Variable Displacement Pumps. Amplified signals up to 5-watts actuate drive controls. Cushioned, full-speed drive reversal. These small, rugged, Oilgear *ANY-SPEED* Pump and Motor Drives easily convert output from constant speed electric motors into the exact, required traverse and elevation speeds, direction, and torque . . . even under high overload conditions. An automatic feedback control compensates for load, voltage, or viscosity changes to accurately maintain computer-selected speeds. Torque transmitted automatically increases or decreases to a point just sufficient to overcome resistance. There's no "wire-drawing," or bypassing of fluid to generate heat or waste power. Both systems are totally enclosed, automatically protected against overload, pressure and flood lubricated to assure long, dependable, maintenance-free, service life.

OILGEAR *Application-Engineered* Servo-Controlled Drive Systems for Missile Launchers



(C) Oilgear Electrohydraulic Servo-Valve-Controlled, Two-Way, Variable Displacement Pumps.
(D) Oilgear Servo-Valve Controlled Pump Stroker — controls displacement and direction of fluid flow.
(E) Oilgear Transfer Valves.

Oilgear engineering and equipment has solved innumerable "problem drives." Users of Oilgear *ANY-SPEED* Drive and Control Systems in the paper, marine, food, chemical, pharmaceutical, primary metals, metalworking, textile, rubber, and other industries — as well as the military . . . agree that — *"for the lowest-cost-per-year . . . it's OILGEAR!*

For practical solutions to YOUR rotary or linear drive and control problems, call the factory-trained Oilgear Application-Engineer in your vicinity. Or write, stating your specific requirements, directly to . . .

THE OILGEAR COMPANY

Application-Engineered Fluid Power Systems

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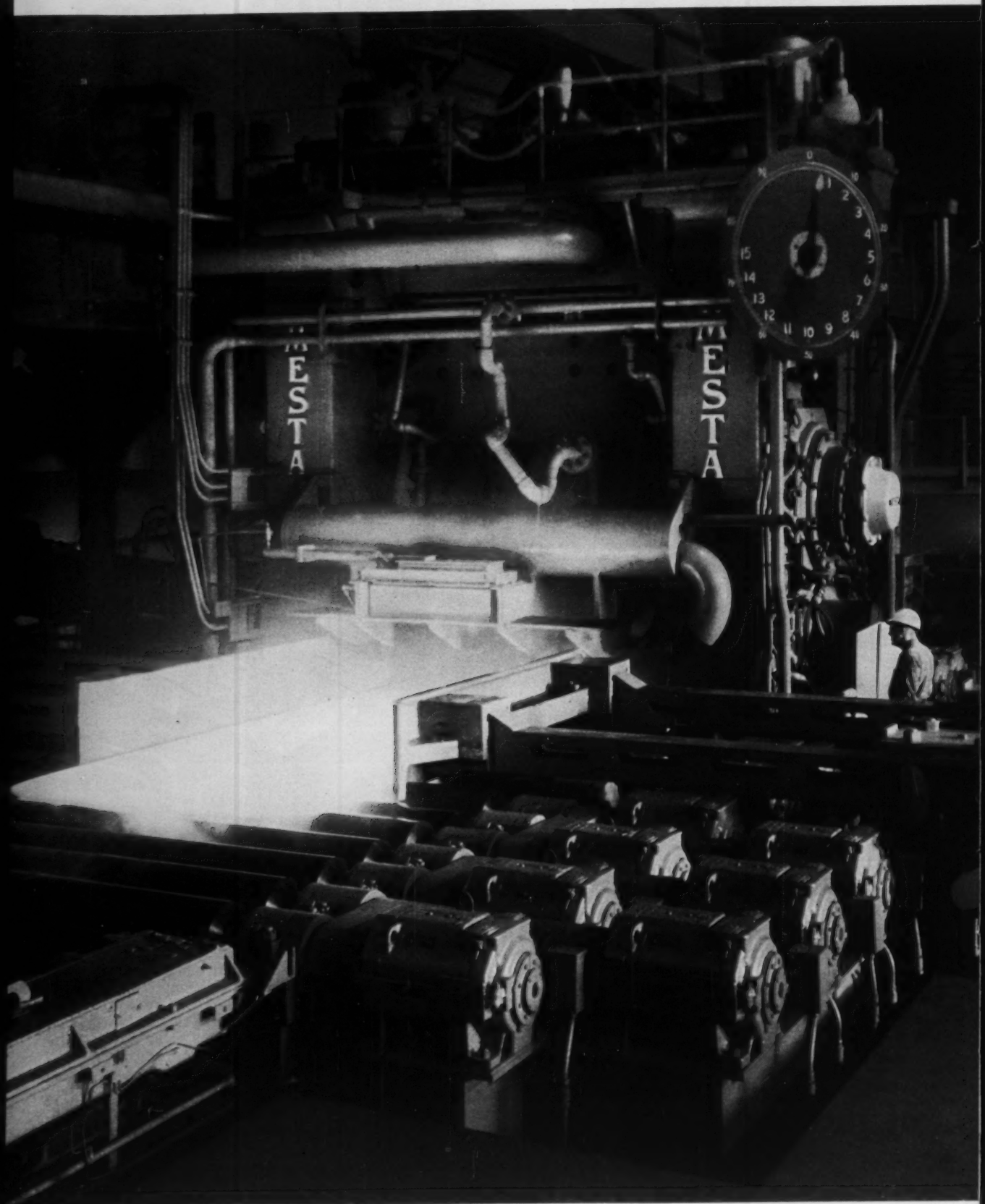
Phone: Mitchell 5-6715 . . . Direct Distance Dialing Code — 414


MESTA
MESTA

Computer Controls make it

"AOK" AND "GO" ALL THE WAY at Gadsden

Just as with Project MERCURY, computers now help to assure top performance of the new, giant 134″ plate rolling mill of Republic Steel, Gadsden, Alabama.

From the time a hot slab of steel approaches the mill, until it emerges as plate, electronic computers are in charge, to produce plate sizes within new, remarkably exact limits. Only the console controller can cancel or alter the "flight" of material through the rolls. "Briefing" of the mill, via punch-cards, plots the course of material through a series of reducing and descaling stages—predetermining and governing each move.

The second phase of this major breakthrough will be accomplished with the installation of a new, programmed plate gage control—believed to be the first of its kind in steelmaking history. Called the PRESSDUCTOR, the new gage control utilizes a magnetic sensor located under the last roll to report back electronically to the computer whenever there is deviation. Corrections will be automatic, instantaneous.

Phase three will be the addition of even more sensitive front and back X-ray inspection devices to measure plate thickness. Here, too, signals will be transmitted electronically to the computer—assuring continuous, automatic accuracy.

These are examples of space age technology applied to make Republic plate production "AOK" and "GO" all the way . . . examples of greatest possible significance to Republic Steel users, in terms of quality and service.

GADSDEN PLATES

are produced to the following limits:

Sheared Plates . . . . . up to 92″ wide, and up to ⅝″ thick
Torch-Cut Plates . . . . . up to 84″ wide, and up to 2″ thick
Universal Mill Plates . . . up to 48″ wide, and up to 2″ thick

Steel
Strong
Modern
Dependable

REPUBLIC STEEL

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666. Jomac work glove. Reversible—any two make a pair. Men's knitwrist.

It's GLOVEMANSHIP that makes JOMACS

your best buy in industrial work gloves

GLOVEMANSHIP is an art. It involves combining the ideal yarns, processing the cloth by techniques which will impart the wearing and protective qualities desired, creating patterns, styling cuffs and, finally, producing the finished gloves with real craftsmanship. Jomac practices GLOVEMANSHIP.

What does GLOVEMANSHIP mean to you? It means lower glove costs with quality gloves that afford maximum dexterity, more comfort; that resists oils, greases and stains; that protect hands and forearms against such hazards as cuts, burns, bruises and abrasions; that can be washed time after time.

For better fit, greater dexterity, more comfort, longer wear, and maximum safety in handling most chemicals, oils, greases, etc. — specify North PVC Coated Gloves.

To keep workers dry and comfortable in foul weather and to give them superior protection against chemicals, oils and greases—specify North PVC Protective Clothing.

Write for more information about Jomac industrial work gloves today.

JOMAC Jomac Inc., Dept. E
Phila. 38, Pa.

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"Jomac Sells Quality . . . and Quality Sells Jomac!"

CALENDAR
OF MEETINGS

Aug. 16-19, Society of Automotive Engineers: National meeting, West Coast Sheraton Hotel, Portland, Oreg. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: Joseph Gilbert.

Aug. 22-25, Western Electronic Show and Convention: Cow Palace, San Francisco. Convention director: Calvin K. Townsend. Business office: 1435 La Cienega Blvd., Los Angeles 35, Calif. Northern California office: 701 Welch Rd., Palo Alto, Calif.

Sept. 10-12, Steel Service Center Institute: Great Lakes regional meeting, Greenbrier Hotel, White Sulphur Springs, W. Va. Institute's address: 540 Terminal Tower, Cleveland 13, Ohio. Executive vice president: Robert G. Welch.

Sept. 11-15, Instrument Society of America: Annual Instrument-Automation Show, Memorial Sports Arena, Los Angeles. Society's address: 313 Sixth Ave., Pittsburgh 22, Pa. Executive director: William H. Kushnick.

Sept. 14-16, Packaging Machinery Manufacturers Institute: Annual meeting, The Homestead, Hot Springs, Va. Institute's address: 60 E. 42nd St., New York 17, N. Y. Executive director: Russell L. Sears.

Sept. 17-21, Non-Ferrous Founders' Society: Annual meeting, Shawnee Inn. Shawnee-on-Delaware, Pa. Society's address: 1604 Chicago Ave., Evanston, Ill. Executive secretary: Herbert F. Scobie.

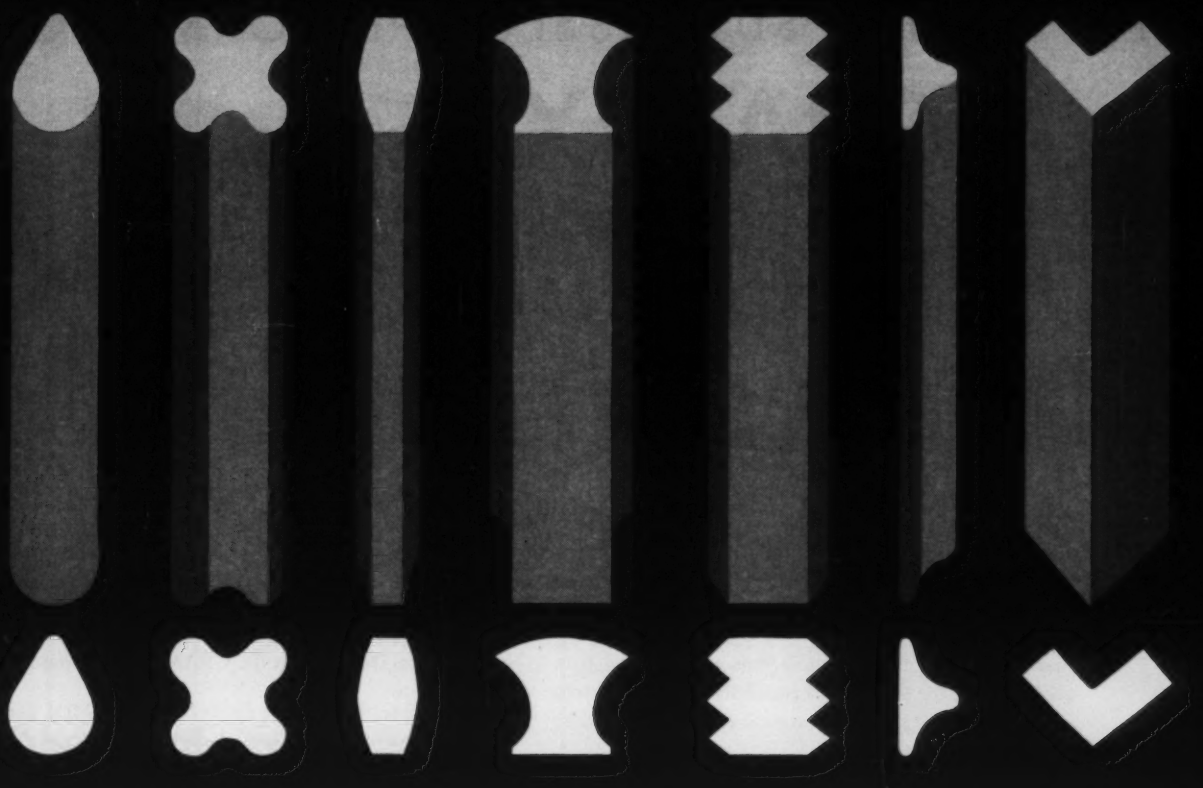
Sept. 18-20, Standards Engineers Society Inc.: Annual meeting, Hotel Sherman, Chicago. Society's address: Box 281, Camden 1, N. J.

Sept. 24-26, Steel Founders' Society of America: Fall meeting, The Homestead, Hot Springs, Va. Society's address: 606 Terminal Tower, Cleveland 13, Ohio. Executive vice president: F. Kermit Donaldson.

Sept. 24-28, Pressed Metal Institute: Annual meeting, Grand Hotel, Point Clear, Ala. Institute's address: 3673 Lee Rd., Cleveland, Ohio. Managing director: J. D. Keith.

Sept. 25-28, American Welding Society: Fall meeting, Adolphus Hotel, Dallas. Society's address: 33 W. 39th St., New York 18, N. Y. National secretary: Fred L. Plummer.

Sept. 25-28, Association of Iron & Steel Engineers: Annual convention, Penn-Sheraton Hotel, Pittsburgh: Association's address: 1010 Empire Bldg., Pittsburgh 22, Pa. Managing director: T. J. Ess.



Some typical Page pre-shaped wires, enlarged for clarity.

Cut your costs, improve your product with PAGE *Pre-Shaped* WIRE!

PAGE *pre-shaped* wire simplifies product design, reduces material costs. It requires no machining, no forming, no forging. It's delivered to you in *any* shape you require—from the simplest standards to complex "specials" made from your own drawings. You can specify low carbon, high carbon, alloy or stainless steels, or ARMCO ingot iron. The PAGE mill is America's leading special-purpose wire producer, so your specifications regarding physical properties and size tolerances are no problem. What's more, you can order your PAGE *pre-shaped* wire shipped with the kind of packaging you want. Most important, you can *always* count on PAGE uniformity.

Send us a sample of the shaped wire you now use, or a description of your wire needs—prove to yourself how PAGE can help. Tell us your wire analysis and tonnage requirements. We'll recommend a PAGE *pre-shaped* wire to help reduce your costs, simplify your manufacturing and improve your product.

Write us at Monessen, Pa. for Booklet **DH-1226** on PAGE *pre-shaped* wire, or for information on what PAGE has to offer to meet your other wire requirements

PAGE *the source for answers to wire problems*

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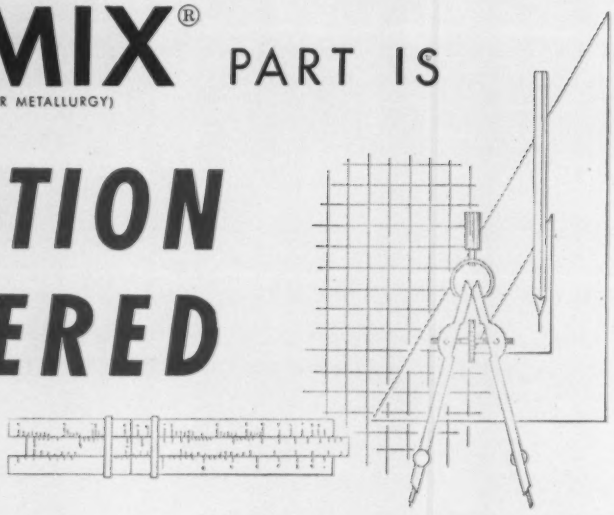
TO INSURE SUCCESSFUL PERFORMANCE

EVERY GRAMIX® PART IS

(PRODUCTS OF POWDER METALLURGY)

APPLICATION ENGINEERED

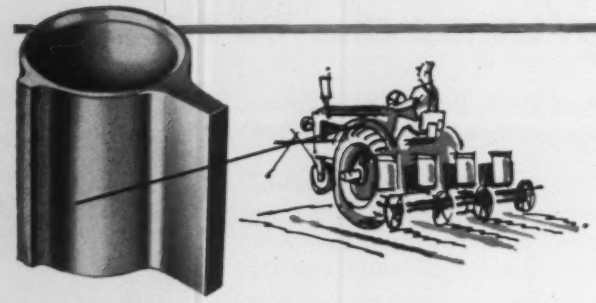


One of the most important factors to consider when purchasing powder metal parts is that of successful part performance; for a part to successfully perform its job, all of its physical and metallurgical characteristics must be suited to the application.

GRAMIX Products of Powder Metallurgy are always *Application Engineered,* which means product is specially matched to each specific application. From an almost unlimited variety of metal mixtures, one alloy is blended that contains the required properties and characteristics of the finished part; *all* aspects of part design and conditions under which it must operate are taken into account. Only then is the GRAMIX part produced.

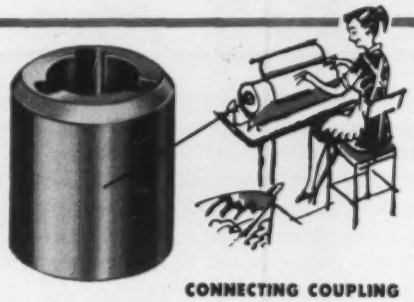
Eight of these *Application Engineered* GRAMIX parts are shown here. Each precisely suits the requirements of its job . . . each is the best part available for the job.

When you specify a GRAMIX part, you can always be sure that it has been *Application Engineered* for successful performance, long life and complete reliability. For more information on *Application Engineered* GRAMIX parts, write for Engineering Handbook G-55.



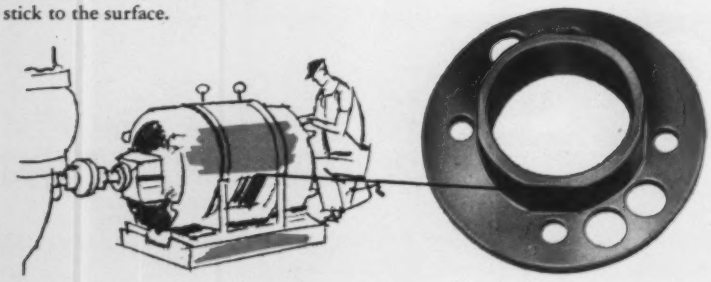
CORN SEEDER

GRAMIX was the material specified for this corn seeder part because the surface finish obtainable with the alloy used reduced the tendency of material to stick to the surface.



CONNECTING COUPLING

The connecting coupling employed in a small home ironer is formed from a special GRAMIX hardened steel alloy; it offers low wear and shock resistance.



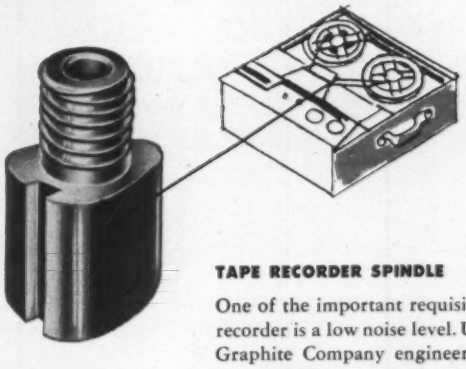
CONTAINER COVER END CAP

Great savings were realized when retainer caps for certain types of electric motors were made of GRAMIX.

This process made it simple and economical to mold the multiple holes to precise tolerances without extra operations.

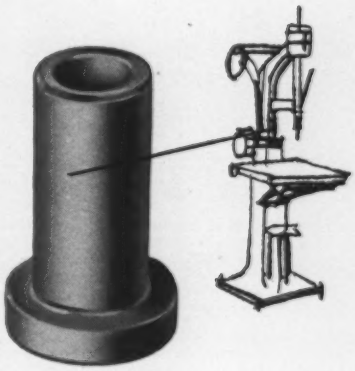
HELICOPTER THRUST WASHER

The outstanding features of the GRAMIX alloy specified for this thrust washer are a dependable and consistent friction and wear pattern as well as a fine surface finish.



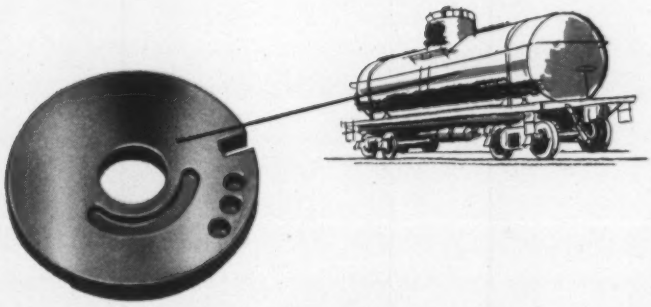
TAPE RECORDER SPINDLE

One of the important requisites in a tape recorder is a low noise level. United States Graphite Company engineers developed a special alloy to meet these requirements in the GRAMIX spindle.



GUIDE BEARING

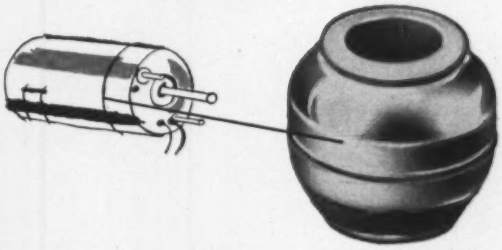
Built-in lubrication and low friction to reduce heat are important features of the GRAMIX alloy chosen for this guide bearing.



LIQUID PUMP END PLATE

This end plate is typical of many parts employed in liquid pumps of many types.

It is made from a wear resistant bronze alloy that was developed for pump applications.



FRACTIONAL H.P. MOTOR

The GRAMIX bearing for this Fractional h.p. motor was developed from a special low noise level alloy.

Its self-lubricating properties were also an important consideration in specifying GRAMIX.

METAL POWDER mpi INDUSTRIES FEDERATION

X-296-2

THE UNITED STATES GRAPHITE COMPANY

DIVISION OF THE WICKES CORPORATION, SAGINAW 18, MICHIGAN

GRAPHITAR® CARBON-GRAPHITE • GRAMIX® POWDER METALLURGY • MEXICAN® GRAPHITE PRODUCTS • USG® BRUSHES

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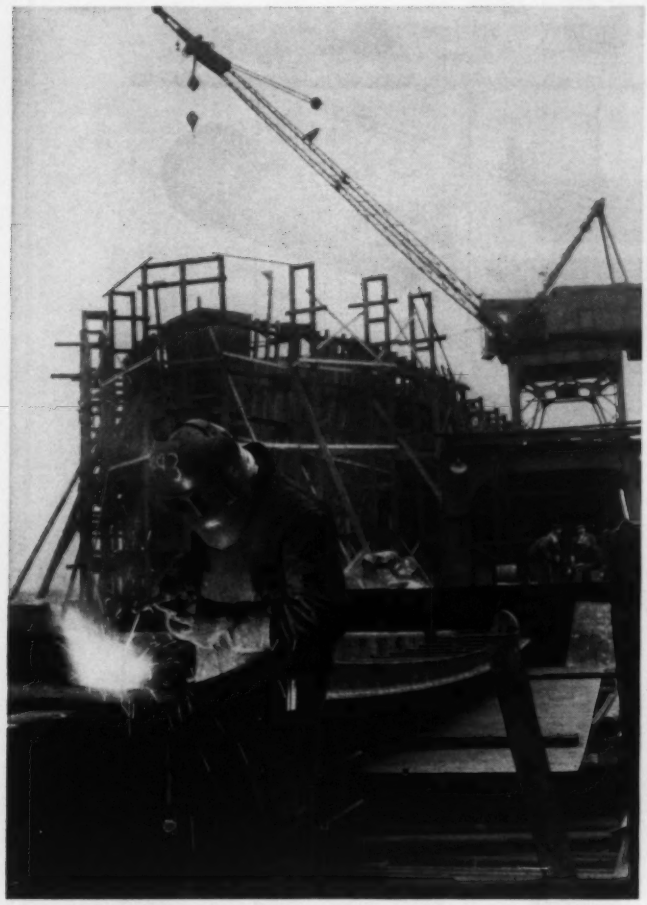
. . . welders that have the greatest operator appeal—Lincoln **Idealarcs.** Men work better with these machines simply because they like them better.

▸▸▸LINCOLN IDEALARC WELDERS

TM, R3M and TIG are the designations for the families of Lincoln heavy-duty Idealarc welders. R3M uses DC electrodes only; the TM, both AC and DC electrodes; and the TIG, either type electrode plus the inert gas process. One or more of these machines will handle every conceivable manual welding task, and, at the same time, permit your operations to stay flexible to meet future market conditions or accommodate newly developed electrodes. And do it profitably!



Shipyard work has flat fabrication where high-speed AC electrodes are best—and vertical and overhead welding when DC is preferred. *Idealarc TM's* are available in two models—straight AC, and AC/DC. The latter was used here since with it, you can change from one current to the other just by flipping a switch . . . that fast. This kind of flexibility lets you stay competitive as demand for high speeds and top electrode performance increases.

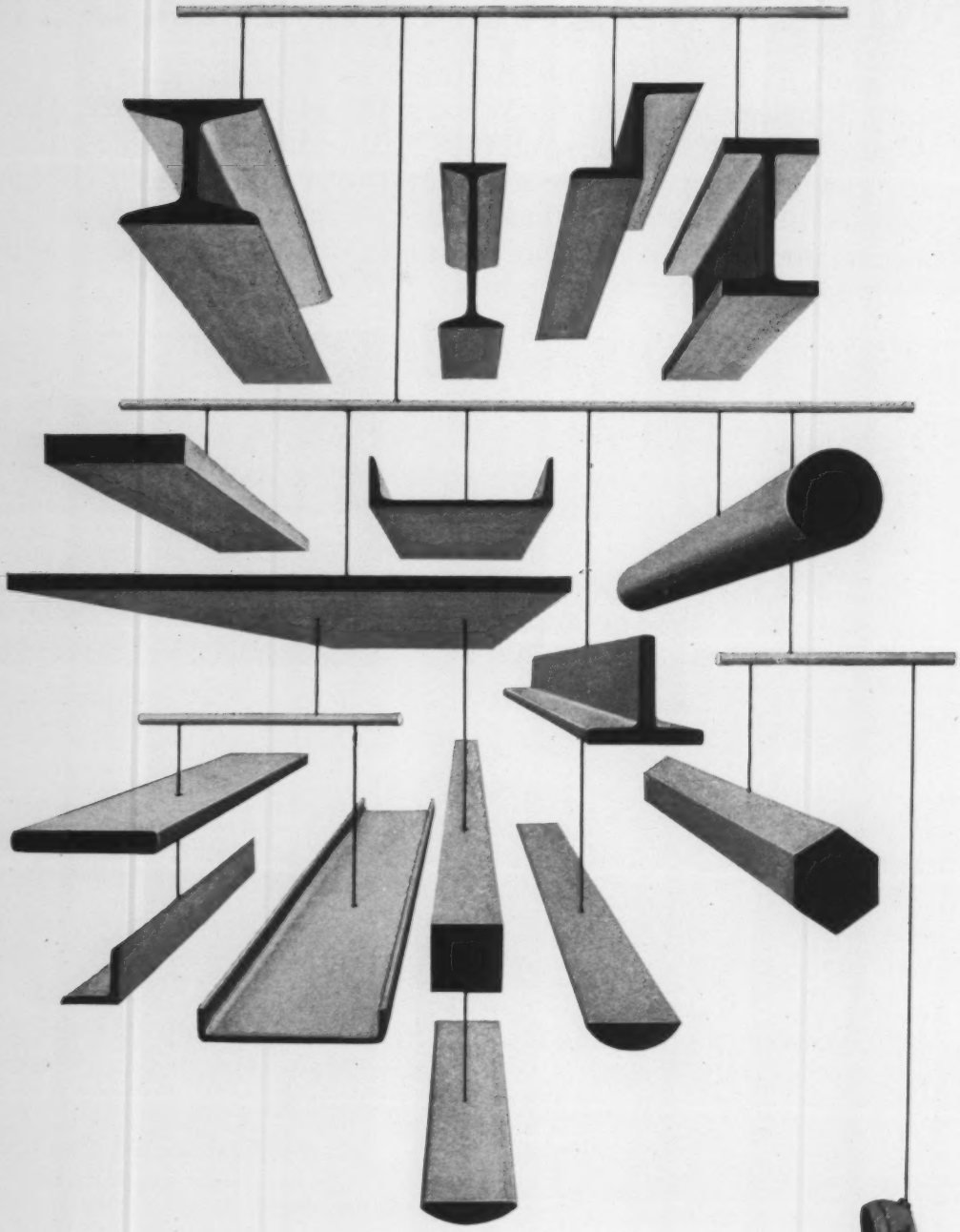
While stick welding makes up the bulk of most shop work, there is a growing use of stainless steels, aluminum, magnesium and other non-ferrous metals which are welded with an inert gas shield. Lincoln's *Idealarc TIG* welder provides both AC and DC currents plus high frequency, gas and water controls for the Tungsten Inert Gas process. It is the most complete, most versatile machine made for manual welding, and thus is ideal for large job shops.

Structural and heavy equipment fabricators feel that low machine cost plus reliability are the keys to profits on long-run, repetitive production work such as this. *Idealarc TM's* were chosen here since they are the lowest cost, straight AC welder made. And they have proved dependable through years of hard service. Get facts about Idealarcs from your Lincoln field engineer . . . a specialist in welding. Or write for bulletins which describe each machine in detail.

THE LINCOLN ELECTRIC COMPANY • DEPT. 2951 • CLEVELAND 17, OHIO

LINCOLN WELDERS

THE WORLD'S LARGEST MANUFACTURER OF ARC WELDING EQUIPMENT AND ELECTRODES



Call any one of 20 Ryerson service centers for bars, shapes, structurals and plates. No one comes close to equaling Ryerson stocks of hot rolled carbon steels in shapes, sizes and tons. And no one equals Ryerson quality controls and cutting accuracy. So be Metalogical—call Ryerson.

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STEEL
The Metalworking Weekly

Metalworking Week

August 7, 1961

Homer Sees Business Improving

Arthur B. Homer, chairman, Bethlehem Steel Corp., looks for a moderate improvement in business, but no splurge. He expects 1961 ingot output to be around 100 million tons. He looks for the third quarter to be better than the second and the fourth better than the third. He foresees a "moderate" build-up in customer inventories. He sees continued improvement in construction and a broadening in steel requirements for machinery makers.

Steel Prices Cut by Chicago Warehouse

Central Steel & Wire Co., Chicago, has effected price reductions on galvanized sheets ranging from $8 to $12 per ton. Other big warehouses indicate they'll follow suit. Robert J. Heggie, president, A. M. Castle & Co., for example, said: "I feel sure that any major competitor will have to follow."

Armco's Johnston Says Price Hikes Must Come Soon

Price adjustments in some lines of steel must come soon to offset rising costs, Logan T. Johnston, president, Armco Steel Corp., said last week. "We have to do more in this industry than just meet our dividend requirements," he asserted. "It is still too soon" to predict when the hikes will come, he said. He reported that Armco's shipments in July and orders for August are both above the like 1960 levels, and said: "We are optimistic about the remainder of the year."

Phillippe and La Pierre Get Top GE Posts

Gerald L. Phillippe (photo), formerly comptroller, has been elected president of General Electric Co., and Cramer W. La Pierre, formerly vice president-electronic and flight systems, has been named executive vice president. Ralph J. Cordiner relinquishes the title of president, but will continue as chairman —and all operating components of the sprawling enterprise will continue to report directly to him. Mr. Phillippe will directly control all staff functions, including accounting, engineering, law, management consultation, manufacturing, marketing, relations, research, and treasury. Mr. La Pierre will direct his efforts to all planning activities of the firm, to special business situations, and to emphasis of the company's technical progress.

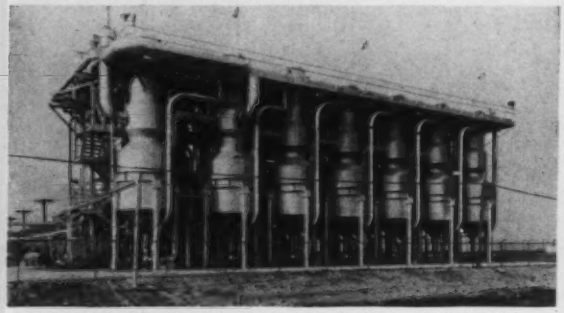
How BDSA Sees Outlook for Four Industries

The Business & Defense Services Administration has begun its series of reports on the second half outlook for key industries. Here's a summary of the first four reports: **Aluminum**—Increasing shipments to domestic customers during the second half are expected to bring the annual total to a

Technical Outlook—Page 65 Market Outlook—Page 97

level above that of 1960. **Textile Machinery**—Production may be somewhat below 1960's record $500 million. **Steam Turbines**—Orders will continue upward but at a slower pace than in 1960. **Magnesium** — A second half upturn should result in greater consumption this year than last.

Salt Water Conversion: Big New Market Is Born



The Interior Department's demonstration plant (photo above) at Freeport, Tex., is a symbol of what will become a giant new industry and a big market for metalworking. Water desalinization looms as a necessity for most of the countries in the Free World. Interior Secretary Udall (photo) sees desalting as a key to the solution of the world's pressing water problems. For tips on the size of the market and how to get into it, see Page 41.

McDonald, Hoffa Top Union Spenders

David J. McDonald, president of the United Steelworkers, was the top spender among upper-bracket union leaders last year. His expenses, in addition to salary, totaled $38,619, the union's statement to the Bureau of Labor-Management Reports shows. Teamster boss James R. Hoffa ranked second with $2745 in "allowances" and $17,081 in "other disbursements."

Particle Control Beefs Up Compacts

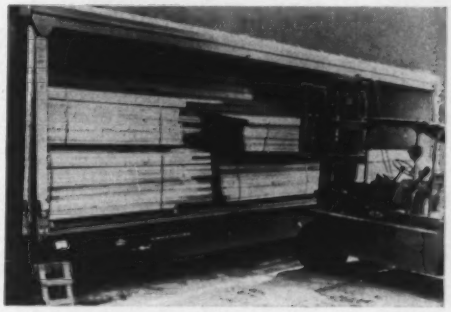
You can control the strength of pressed compacts of powdered metals by controlling the particle size, size distribution, and particle shape, as well as compacting pressure. Green strength determines your ability to handle the parts before sintering. It becomes particularly important as the size (see photo) and complexity of powder parts increase and tougher metals are used. For example, the use of irregularly shaped tungsten particles will help build the green strength of compacts (Page 66).

Will Germany Help Solve U. S. Unemployment?

Some unemployed U. S. steelworkers may get an opportunity to take jobs in the booming German steel industry, where there is a manpower shortage. The idea is being studied by Ramsey Harris, a director of the American Students' Information Service, which sends U. S. students to Europe. He has contacted the Ohio State Employment Service about the plan.

Boxcar Has Giant Door

This Full-Door boxcar is the first of 200 being built for Southern Railway System by Pullman-Standard. The door opening is 50.5 ft. The aluminum door rolls into the ceiling of the car, like an overhead garage door.



BLS Studies Construction's Effect on Employment

At the current rate of construction, the building of public schools is providing full-time employment for about 275,000 workers. More than 115,000 are required at the sites and 160,000 in industries providing materials and services. So finds a survey by the Bureau of Labor Statistics, first in a series measuring the impact of various types of construction on the nation's employment. BLS reports that each $1000 of school construction takes 84 manhours on-site and 128 manhours off-site.

FTC Reveals Trend in Profit Return

The Federal Trade Commission has made public a report on rates of return (after taxes) on stockholders' investment in selected manufacturing industries for three years:

	1940	1958	1959
Blast Furnaces, Steelworks & Rolling Mills	8.2%	8.1%	8.1%
Primary Smelting & Refining, Nonferrous Metals	10.6	6.6	7.4
Tin Cans & Other Tinware	9.4	10.4	9.0
Engines & Turbines	14.8	9.6	13.2
Office & Store Machines	12.3	13.7	14.3
Electrical Machinery, Equipment & Supplies	14.4	12.1	14.0
Motor Vehicles	17.4	8.7	16.2
Motor Vehicle Equipment	15.1	6.1	12.4

Diamond Knife Becomes Precision Cutting Tool

This diamond knife, with a radius equal to 12 carbon atoms, will make high precision cuts in metals and nonmetals. Produced by E. I. du Pont de Nemours & Co. Inc., it is now being used in research projects. The firm has made such knives up to 9/32 in. long. They're resharpenable. For details, see Page 70.

Seven Firms Charged with Antitrust Violations

Seven firms serving the oil industry have been charged by the Justice Department with violating Sections 1 and 2 of the Sherman Antitrust Act. The firms: Borg-Warner Corp., Dresser Industries Inc., Halliburton Co., McCullough Tool Co., Pan Geo Atlas Corp., Schlumberger Well Surveying Corp., and Jet Research Center Inc. The complaint charges the firms pooled know-how, made Borg-Warner the exclusive agent for all the defendants' jet process

STEEL The Metalworking Weekly

August 7, 1961 Vol. 149 No. 6

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patent rights, denied the sale of certain supplies to nonlicensees of the patent pool, and discouraged price competition.

How Depreciation Affects Employment, Growth

A new survey by the American Economic Foundation links this nation's unemployment problem and low rate of growth to our outmoded depreciation rates. This table tells the story:

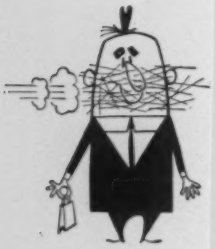
	Depreciation Allowed in First 5 Years	Rate of (1) Economic Growth Index: 1953=100	Percentage of (2) Unemployment
Japan	More than 100%	325	1.1
Italy	100%	207	5.4
West Germany	76.3%	188	Less than 1%
France	90%	185	Less than 1%
Sweden	100%	148	1.7
England	65.6%	136	1.6
Canada	66%	127	11.1
U. S.	40%	114	6.8

(1) Industrial production. Figures are for March, 1961. Source: United Nations.
(2) Figures are for 1960.

Japan, India to Use Swedish Centrifugal Casting Process

Japan's Shin-Nippon-Koki Co. Ltd. and India's Prakash Engineering & Rolling Mills Ltd. will manufacture cast iron soil pipe via the centrifugal casting method under a license from AB Akers Styckebruk, Swedish steel firm. So reports the Swedish Chamber of Commerce of the U. S. A.

Straws in the Wind



The International Molders & Foundry Workers Union has been defeated for the third time in a union election at Mesta Machine Co.'s West Homestead (Pa.) Works ... Japan produced a record 13,225,000 tons of steel during 1961's first half to move it past Britain into fourth place among steel producing nations, the Japan Iron & Steel Export Association reports . . . The petroleum industry will buy $50 million worth of electronic, remote control supervisory systems annually by 1965, predicts Moore Associate Inc., San Carlos, Calif. . . . The Industrial Fasteners Institute's seasonally adjusted index of shipments (1956-58 = 100) rose to 90 in. June from 86 in May and 75 in April, for the highest level since September, 1960.

Metalworking Pulse

The Business Trend: Declines in steel and auto output more than canceled out a record high in production of electricity and a small increase in freight carloadings in the latest week, resulting in a 3 point drop in STEEL's industrial production index. **Autos:** Only Ford Motor Co. is still turning out 1961 models. The 1962 model run at Studebaker-Packard Corp. is being kicked off today. **Steel:** Ingot rates were cut back as orders, mainly automotive, failed to meet expectations.

- **INDUSTRIAL PRODUCTION INDEX** (1947-49 = 100)
  - Week ended July 29 .... 163†
  - Year ago 153
  - Details on Page 51
- **PASSENGER CAR OUTPUT (UNITS)**
  - Week ended Aug. 5 . 35,000*
  - Year ago 103,504
  - Details on Page 48
- **STEEL INGOT OUTPUT (TONS)**
  - Week ended Aug. 5 1,790,000*
  - Week ago 1,818,000
  - Details on Page 102

†Preliminary. *Estimated.

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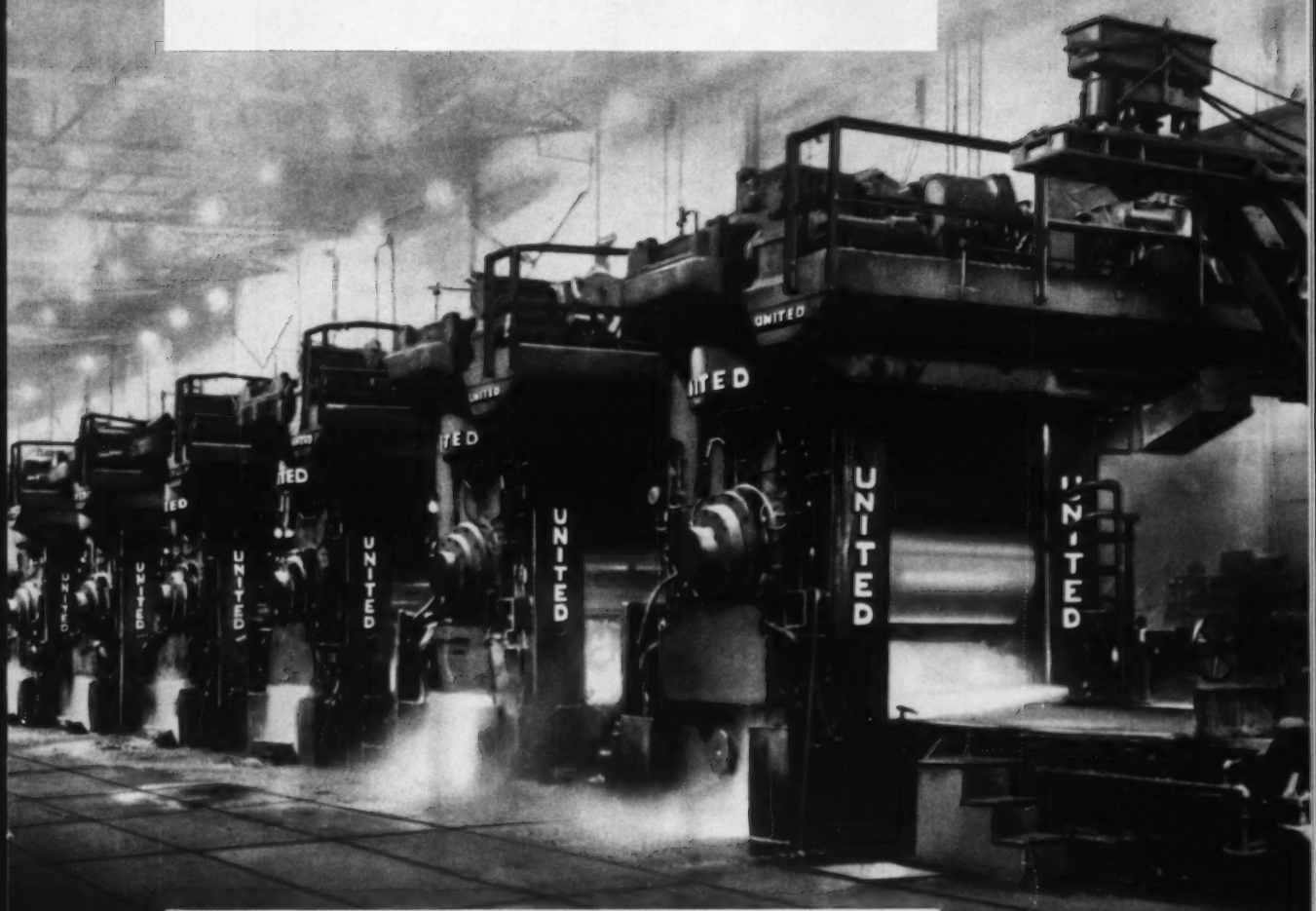
4-HIGH 6-STAND CONTINUOUS HOT STRIP MILL



1901 UEC 1961

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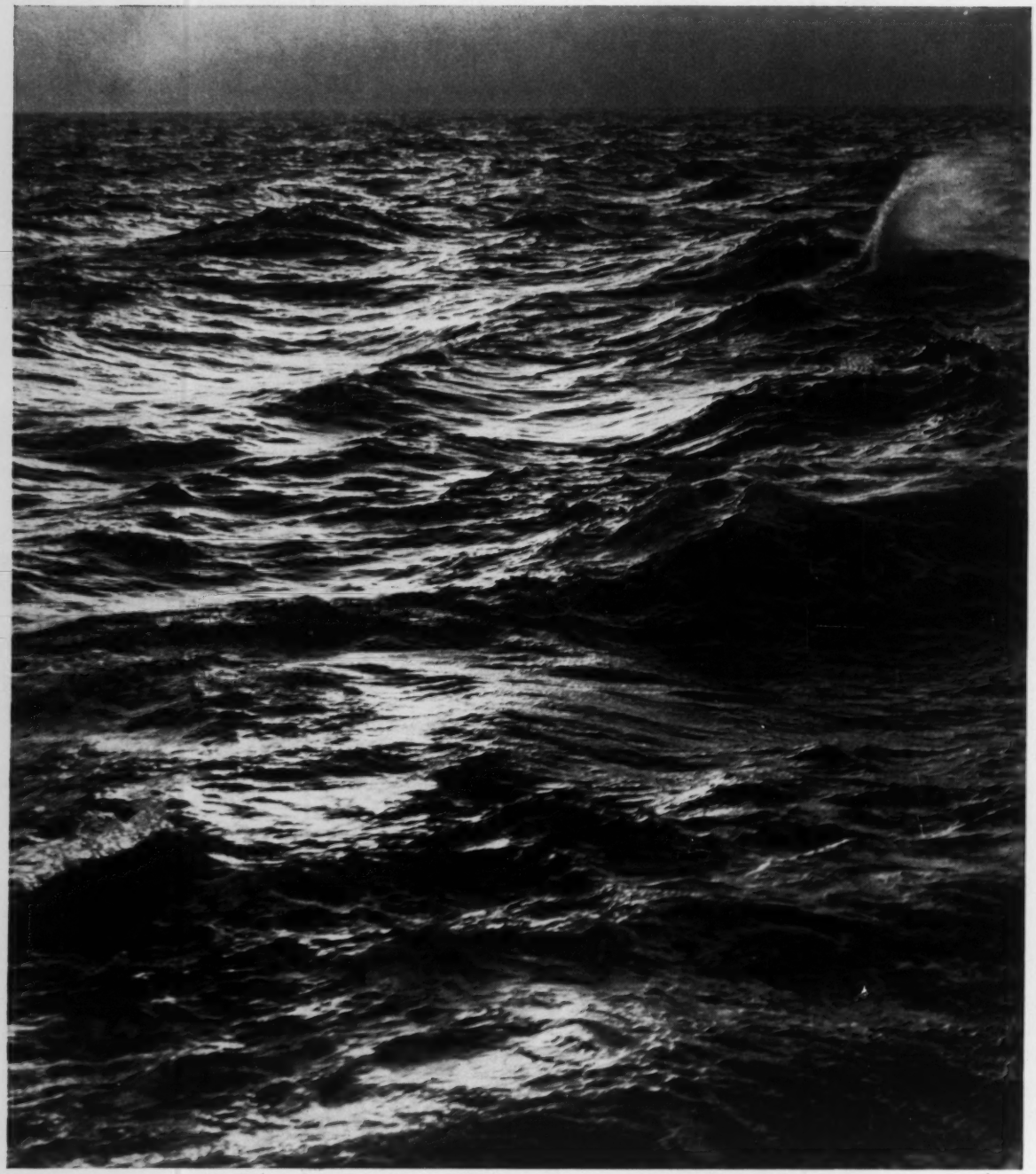

There's business out there.

You're looking at more than a horizon. It's a future, yours and America's. Out there is Europe and Latin America and Asia and Africa. But in 1960, of all U.S. manufacturers, less than 5% saw these foreign shores for what they are worth: a 19-billion-dollar export market, a vast source of foreign trade.

Move in for your share. Build your business and help keep America growing. Extra production creates more jobs, helps balance the outflow of gold, and wins new friends abroad with U.S.-made products.

Even if you've never sold overseas, you have a rare opportunity to start—now. Your U.S. Department of Commerce will help with counsel by experts on what, where and how to sell—with data on credits, payments and financing. A package of invaluable know-how is yours for the asking.

Now's the time to discover the many ways in which your business can grow. In the lucrative export markets. In new U.S. markets. In developing new products. In attracting new industry to your community. Just write or phone the U.S. Department of Commerce Office of Field Services in your city, or Washington 25, D.C. They are ready to help you grow with America!

NOW'S THE TIME TO GET GROWING IN A GROWING AMERICA!

It's more than a matter of taste

Wherever food and metal meet, in a processing plant or kitchen, the metal is usually stainless steel. The flavor *and* purity of food are entrusted to stainless because no other metal matches its resistance to contamination and corrosion. And none—metal or plastic—is so durable, decorative and easy to clean.

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Jones & Laughlin Steel Corporation

STAINLESS AND STRIP DIVISION • DETROIT 34

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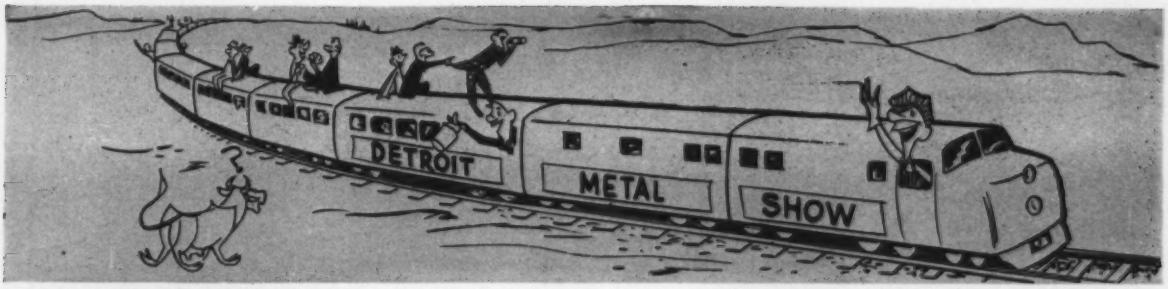
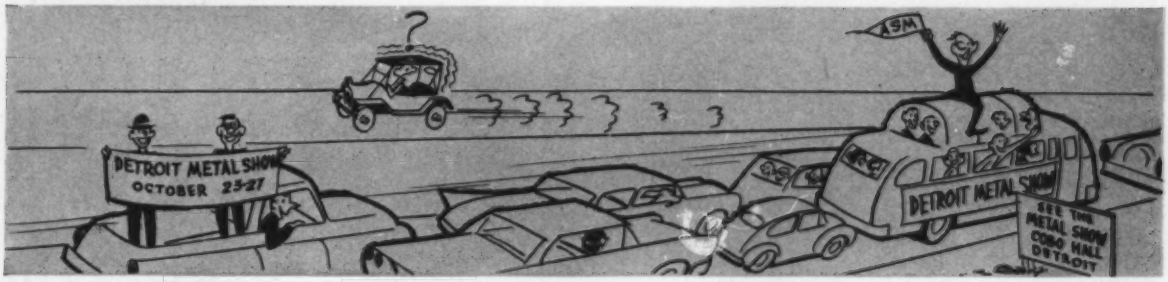
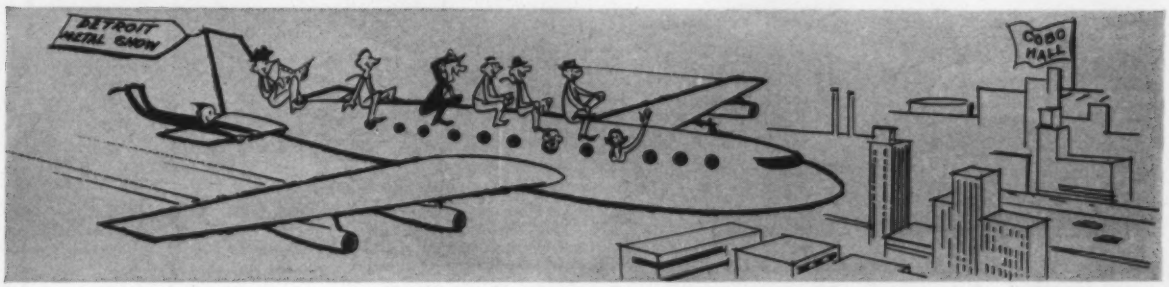


EVERYONE...



10408-ASM

(Well, almost everyone)...



is headed for the 1961 DETROIT METAL SHOW

THE WORLD'S MOST COMPREHENSIVE METALS AND PROCESSING EVENT

OCTOBER 23RD THROUGH 27TH • COBO HALL

Ideas . . . Ideas . . . Ideas . . . stimulating, thought-provoking ideas. How to improve production . . . how to cut costs . . . how to stay ahead of competition. SEE – hundreds of educational exhibits. HEAR – presentation of over 200 technical papers. EXAMINE – processing, inspection and control equipment. VISIT – the spectacular Materials Comparison Center. Yes, *everyone* . . . especially the IDEA man for his company . . . is headed for the 1961 Detroit Metal Show. He wants to *KNOW* more . . . DO YOU?

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Advance Registration Manager, ASM Headquarters, Metals Park, Ohio
Gentlemen: Please register myself (and the names of my associates listed below) for the forthcoming METAL SHOW at Cobo Hall in Detroit.

Name	Title	Indicate Affiliated Organization*	Registration Fee for ASM Sessions and Exposition: $2.00. (Except as noted below)

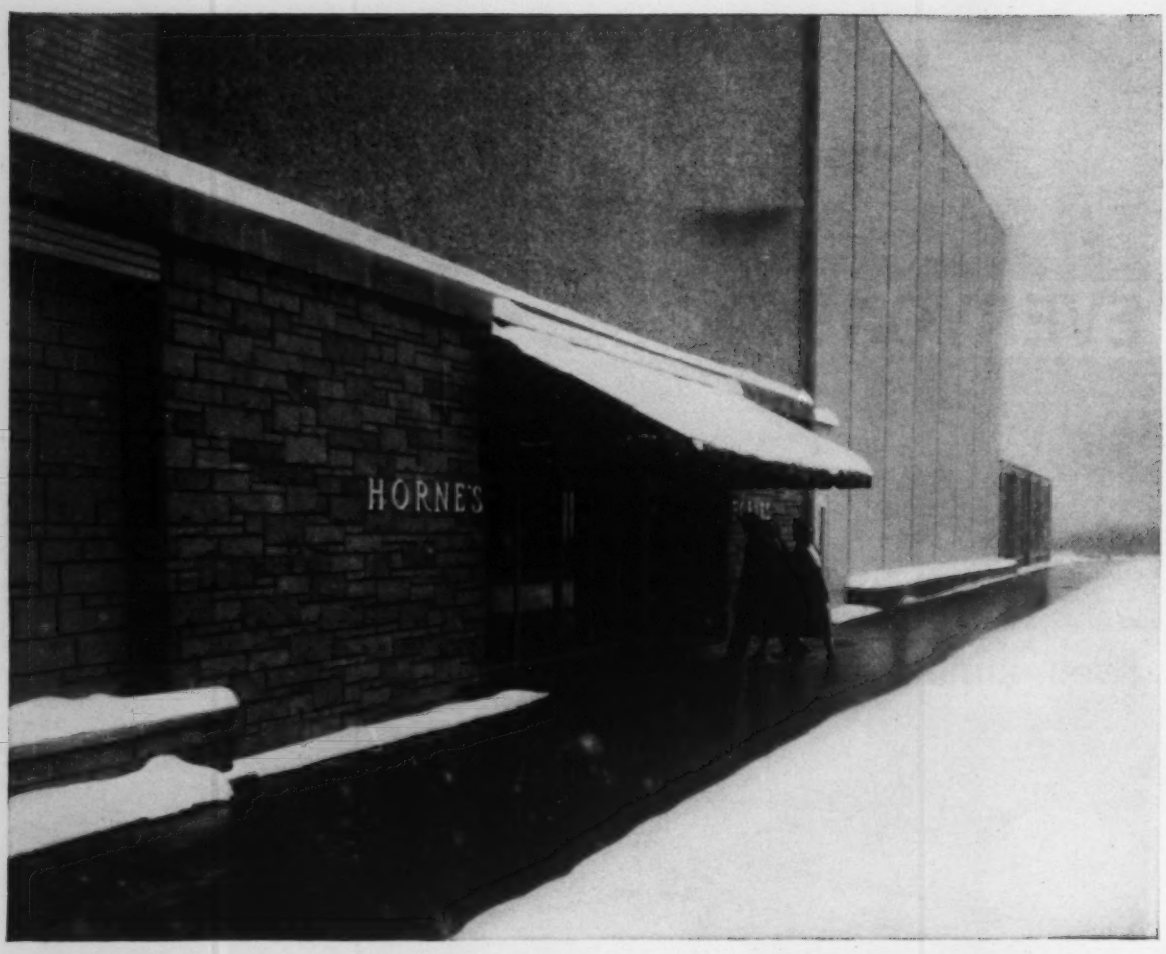
(Enclose check or money order) TOTAL

Company _____

Address _____

City _____ Zone _____ State _____

☐ ASM Members: NO REGISTRATION FEE for ASM Sessions and Exposition.
☐ AIME Members: $5.00 Registration fee includes AIME sessions, ASM sessions and Exposition;
☐ non-members: $10.00 AIME sessions, ASM sessions and Exposition.
☐ SNT Members: $5.00 Registration fee includes SNT sessions, ASM sessions and Exposition;
☐ non-members $7.00 SNT sessions, ASM sessions and Exposition.



This sidewalk is wired for snow

Nickel alloy electric heating cables in the concrete melt snow as fast as it falls!

No shoveling, no salting, no customer accidents on slippery sidewalks at *this* suburban branch of a Pittsburgh department store. Electric heating cables keep the sidewalks clear of snow and ice during even the worst winter weather.

Saves maintenance costs. In addition to taking the bother out of blizzards, the system eliminates the cost of conventional sidewalk clearance. And further savings are realized because the heating cables—made of 80% Nickel—require no maintenance.

High Nickel alloy cables were used because of Nickel's superior resistance to corrosion, fatigue and extreme temperatures. These Nickel alloy cables will withstand years of repeated heating and cooling, and seasonal expansion and contraction of the concrete.

Just one example of Nickel's versatility. Electric heating cables—also used to melt snow and ice from roofs and driveways—is another example of how Nickel helps make possible new products and processes, and improves existing ones. In most any application, Nickel's wide range of important properties . . . corrosion resistance, strength, long life and beauty, to name just a few . . . offers proven advantages.

If your business is metals, or if you use metals in your business, call on Inco for the latest information about how Nickel and its alloys can help you.

Imbedded near the concrete surface, electric heating cables of 80% Nickel keep the sidewalks clear of snow and ice. Cables made by Edwin L. Wiegand Company, Pittsburgh.

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NICKEL MAKES ALLOYS PERFORM BETTER LONGER

Let's Pay for Engineering!

For the last two years, we have been exposing some of the evils of "free engineering." We can report progress—but not enough!

Here are three encouraging examples:

1. A number of companies (including one of the largest) now include this protective clause in formal proposals:

> **"All the information in this proposal is confidential and has been prepared for your use solely in considering the purchase of the equipment described. Transmission of all or any part of this information to others or use by you for other purposes is unauthorized without our written consent."**

2. An auxiliary pipeline equipment company has adopted a new policy which it explains this way:

"We have performed engineering services gratis in the name of sales expense and overhead. We do not feel that the burden of these costs should be borne by customers for standard products. When customers and prospects digress from standard designs, engineering fees will be included in quoted prices. Where engineering is required, we will either ask for a preliminary engineering fee to quote accurately, or we will make a rough estimate, with detailed engineering and final price to be determined after receipt of order.

"In the past few weeks we have found that customers and prospective customers for engineered products not only do not mind paying for the engineering, but in most cases they expect to be charged."

3. A power company requested bids for equipment from three companies. The one that got the contract spent $60,000 preparing the bid. So the power company sent $40,000 to each of the unsuccessful bidders. Consequently, both will bid for future business.

In contrast, we get many reports from people who were "thrown out of the running" when they added engineering charges. We also hear that "free engineering" is especially abused by prime contractors with government work.

As we see it, the problem can only be solved by a better understanding on the part of both buyers and sellers that engineering is never "free."

We think every seller and buyer of engineered products should adopt this slogan: "Let's pay for engineering!"

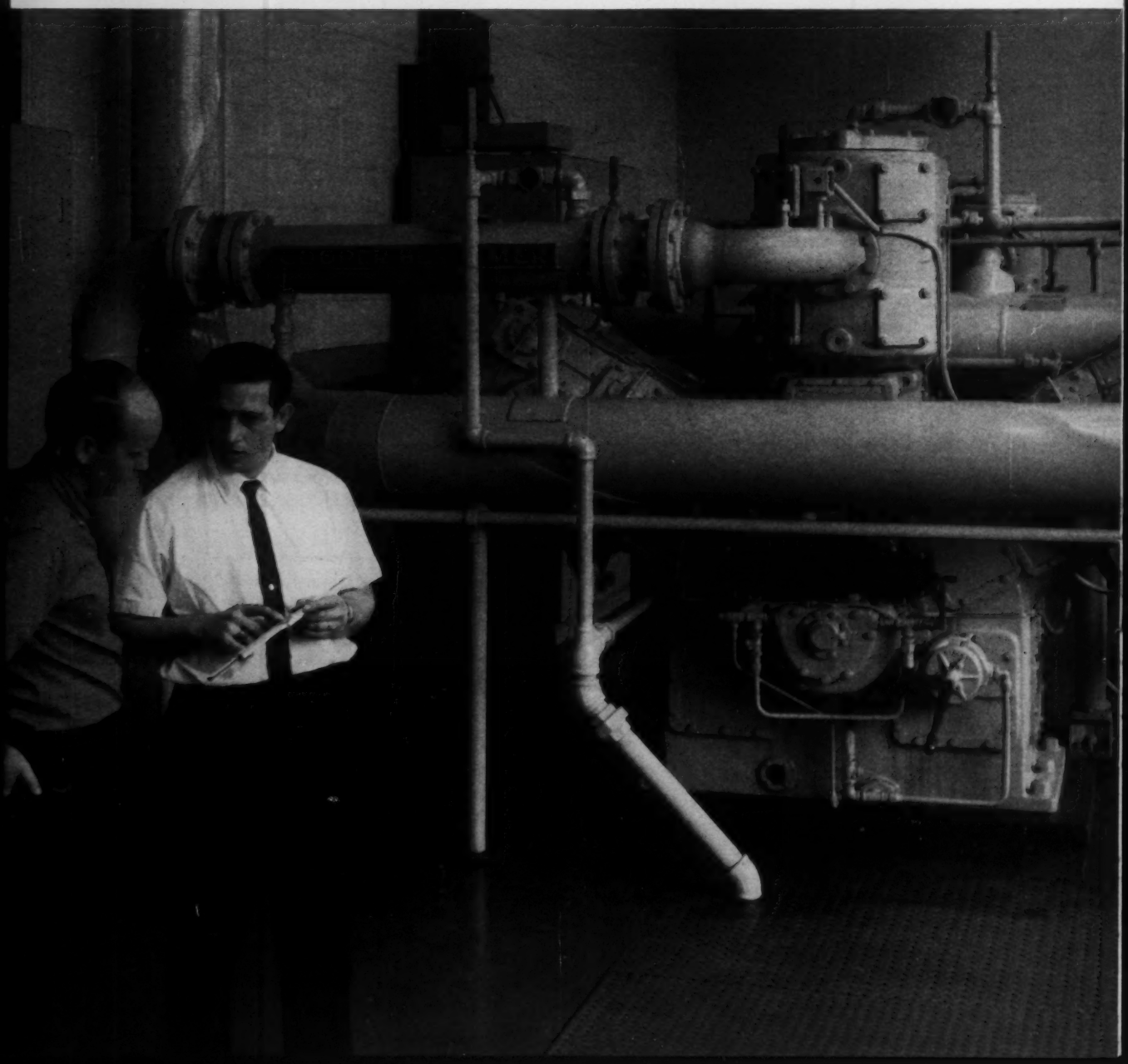
Irwin H. Such

VICE PRESIDENT-EDITORIAL

How DMR Air Compressors boost

Users everywhere report important economies by stepping up compressed air capacity with the new Cooper-Bessemer DMR compressors. These *compact*, 720 rpm machines, unmatched in reliability, are enabling plants to boost output with air tools and, at the same time, conserve compressor floor space and installation cost. In most cases, these units can be installed in existing space near the production load to minimize housing and piping needs.

The new DMR compressors are completely



your production...cut floor space needs

equipped with integral motor drive and intercooler ... ready for operation. Their En-Tronic control, also integrally mounted, automatically regulates the compressors to meet the demands of the air system. They are available in 2 or 3 cylinder designs, 150 to 400 hp, 698 to 2005 cfm at discharge pressures up to 125 psi.

For full particulars, call the nearby Cooper-Bessemer office or air compressor agent. Write for Bulletin 94 on the new DMR line.

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COMPRESSORS: RECIPROCATING AND CENTRIFUGAL
ENGINES: GAS - DIESEL - GAS-DIESEL
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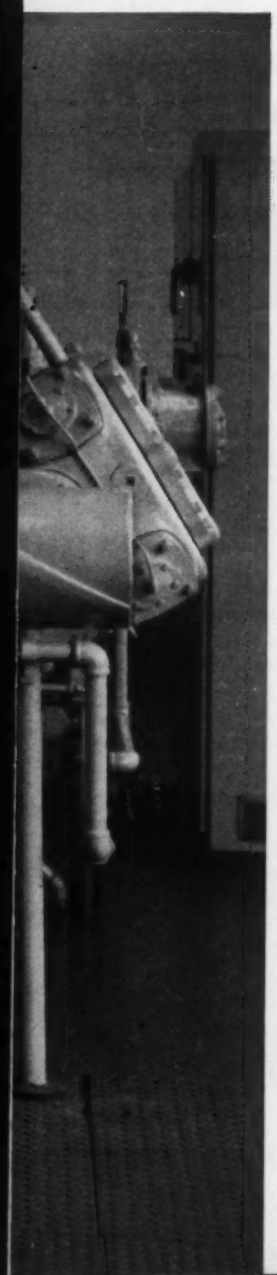
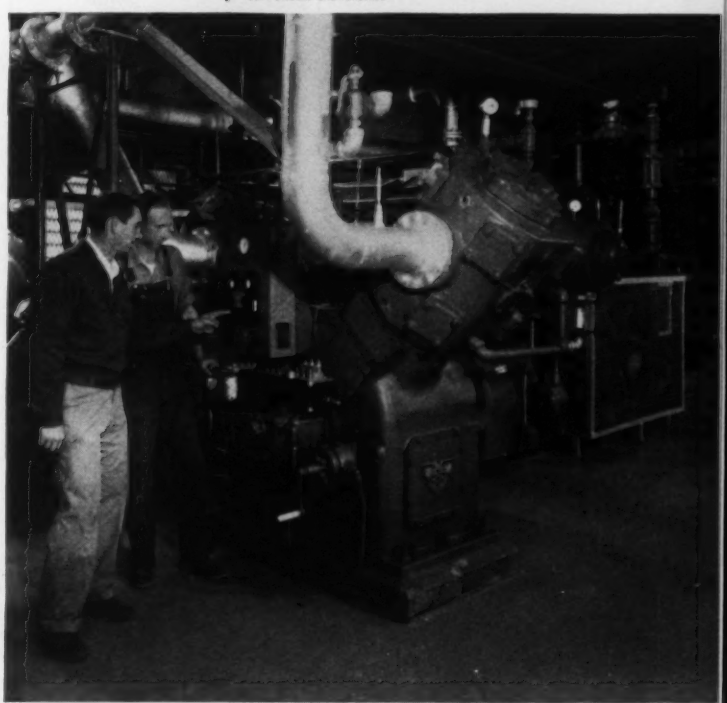


IN A FOUNDRY

... This Cooper-Bessemer DMR-3 air compressor delivers 1658 cfm for portable tools in a Pennsylvania foundry.

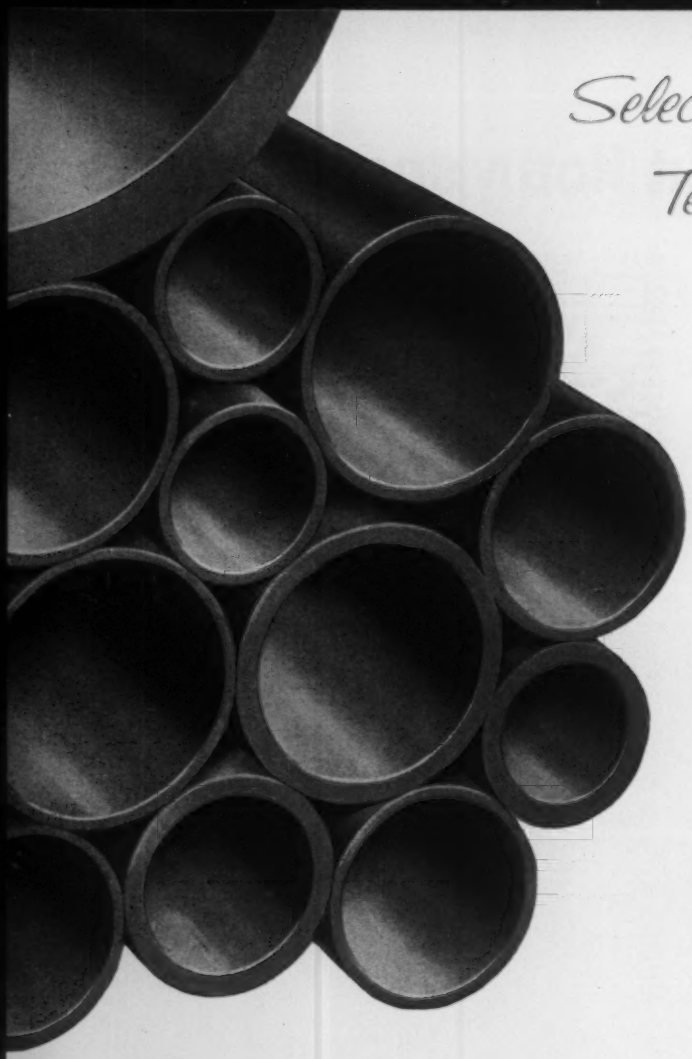


IN A FABRICATING PLANT

... This Cooper-Bessemer DMR-2 compressor supplies 757 cfm air at 125 psig pressure for portable tools.

COMPLETE INFORMATION

on the new line of compact DMR compressors is given in this booklet... free on request. Ask for Bulletin 94.



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Carefully selected prime raw material is slit, edged, shaped and electric resistance welded on the most versatile and modern equipment in operation. At each and every step of the way Ohio Welded Pressure Tubing is under the scrutiny of Ohio's master tubemakers . . . making control tests at frequent intervals . . . testing random samples from each production order far beyond the limits of the usage involved.

For critical pressure piping applications . . . for condensers, heat exchangers, boilers and superheaters — in the range of sizes from ½ to 7½" OD and wall thicknesses from .028 to .375"— mark your prints "*Ohio Custom Made Welded Pressure Tubing.*" There is no equivalent.

Photographs show flare, flattening and crush tests performed continuously on every order. Non-destructive tests include air, water, magnetic, eddy current and visual inspection to insure 100% dependability.

Photomicrograph of polished and acid-etched surface shows perfect microstructure of normalized Ohio Welded Pressure Tubing. Weld area running down the center is now indistinguishable and tube has become, in every sense, weldless.

OHIO

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Division of *Copperweld Steel Company*

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A-4800A

As bargaining tempo quickens . . .

What to Expect from Auto Talks

1. **Settlement will come with no company-wide strikes.**
2. **Big Three will sign contracts for at least two years.**
3. **American Motors will sign for at least two years, but on terms different from the Big Three settlement (perhaps including a modified profit sharing plan).**
4. **The Big Three's package will cost 7 to 10 cents an hour per man for each year of the contract (excluding 3 cents in escalation).**
5. **Pensions will be liberalized slightly.**
6. **Supplemental unemployment benefits will be substantially modified (including severance pay provisions).**
7. **Cost of living (COL) and annual improvement provisions will be retained, but COL will get a ceiling, perhaps by tying it to insurance costs as in the steel industry.**
8. **Companies will not accept salary rating concept.**

LOOK FOR brass tack bargaining in the Big Three auto talks to begin this week.

As of presstime late last week, GM, Ford, and Chrysler negotiations had been confined largely to secondary issues and interpretations of "facts" by each side.

• **AMC's Case**—The only general offer made by automotive management came July 28 from American Motors Corp. AMC proposed giving workers a 10 per cent cut of profits before taxes after deducting 10 per cent of the company's net worth for stockholders. The stockholder figure would be $22 million on the company's net worth of $220 million.

The share for AMC's 23,000 hourly employees would go into a fund which would be available for distribution as cash bonus, or for expansion of such benefits as health care or supplemental unemployment benefits. Based on annual profits of $100 million (AMC's earnings in its last fiscal year were $105.4 million), an average employee's share of profits would be $340.

• **Strings Attached**—AMC tied at least two important strings to the offer: 1. The UAW would have to give up cost-of-living increases. 2. The union would have to forego the annual improvement wage increases of 2.5 per cent.

The union admitted its surprise. In 1958, Walter Reuther proposed profit sharing and was turned down. Under his plan, profits equal to 10 per cent of net capital would be set aside as return on the company's investment. Of the remaining profits, 50 per cent would go to stockholders and company executives, 25 per cent to hourly and salaried employees, and 25 per cent to customers as rebates.

• **Rejection**—Watch for the UAW to reject the company's offer because of the strings. But public relations considerations will force it to do so gently. Although AMC claims its package must be accepted

fully or not at all, don't be surprised if a watered down version gets into its contract.

No version of any sort is likely in the new Big Three contracts. AMC is a special case. Besides being much smaller, its operations are also simpler because it is primarily an assembler. The Big Three are assemblers and manufacturers, and profit sharing would be more difficult to administer.

• **Conventional**—At this date, odds are that the Big Three contracts will be conventional (see the accompanying predictions). The UAW is not serious about the salaried concept. It is more so about the escalator provision in pensions, but doesn't expect to get it this time. It may make more conversation and headlines about profit sharing now that AMC has introduced the matter, but it knows the issue will make no more headway with the Big Three in 1961 than it did in 1958.

You can risk long odds against a company-wide strike. There will even be fewer local walkouts than there were three years ago because much of the negotiating work thus far has been on local matters that caused the disturbances the last time. Example: Extra attention has been given to special provisions for the highly skilled.

• **Aug. 31 Settlement?**—The pace of the talks has been so slow that settlement may be impossible by the Big Three's termination date (Aug. 31). When GM went through the formality (on July 31) of announcing its intention to terminate the pact one month later, it said the notification "should not preclude a discussion of the possibility of a limited extension."

If the pacts aren't signed by Aug. 31, short extensions are more likely than working without a contract, as in 1958. The no-contract approach won't be taken unless the signing can't be managed even with an extension or two.

The union obviously isn't keen about contractless work. While the companies found operating under the hiatus in 1958 no great hardship, it did damage union relationships. So, management also will take the no-contract route only as a last resort.

Top Bargainers in Ford Labor Talks

Kenneth Bannon
Director, Ford Department
United Auto Workers

Bustling Ken Bannon was born in Scranton, Pa., June 27, 1914. After spending his boyhood in the Pennsylvania coal mining area, he went to Detroit in 1936 where he started working at the Ford Rouge Plant. As an active rank and file leader in the UAW's effort to organize the Rouge, Mr. Bannon served as steward, committeeman, unit vice president, and other jobs representing Ford workers—both at the Rouge and Highland Park plants. He took over as director of the union's Ford department in 1947 and has been instrumental in some of the union's greatest victories, including the first industry-wide pension plan in 1949.

Kenneth B. Cassidy
Vice president-industrial relations
Ford Motor Co.

Born and raised in Detroit, Ken Cassidy began his business career as a reporter and financial editor in Detroit. (For a short time, he was a STEEL correspondent.) He entered the automotive industry as an accountant with GM in 1934 and joined Ford in 1946. He became general manager of the Manufacturing Services Div. in 1951, general manager of the Steel Div. in 1953. He was general products group executive from 1956-58, then group director-body group until he was elected to his present job October, 1959. Sixty-three-year-old Mr. Cassidy is primarily responsible for collecting the vast array of facts and figures Ford negotiators are throwing at the UAW in this year's talks.

Malcolm L. Denise
Vice president-labor relations
Ford Motor Co.

Mel Denise is respected as an auto bargainer. He holds bachelor and law degrees from the University of Michigan. After nine years of legal practice, which included five years on the staff of Ford's former legal counsel, he joined Ford in 1946 as associate industrial relations counsel. He was named vice president-labor relations in October, 1959. Mr. Denise handles the day to day bargaining with the union. His incisive language cuts the fat from bargaining talk.

UK Seeks Help in Common Market

PRIME MINISTER Macmillan told Parliament that he wants Britain to join the Common Market to help cure some of her economic ailments. Britain has remained outside the European Economic Community (EEC) since its inception four years ago, but economic pressures now make it necessary to go after a bigger share of the booming continental business.

• **Boom**—The Common Market is regarded as the world's fastest growing buyer of manufactured goods. For the last four years, the UK has watched the EEC blossom in wealth, industrial output, prestige.

The gross national product of EEC countries gained 31 per cent from 1953 to 1959, while Britain and the other European Free Trade Association (EFTA) members had a growth of only 19 per cent.

With the loss of her empire in postwar years, Britain has found that isolation from the continent is no longer working in her favor. She faces economic problems, while the rest of the world, particularly the Common Market, is prospering. Last year, Britain had a foreign trade deficit of nearly $1 billion.

If Britain moves inside the EEC tariff barrier, she will stand a good chance of boosting her exports to the member nations considerably. She is already sending 15 per cent of her exports to them despite the tariffs. Deeper penetration of the market would improve her balance of trade and step up her industrial activity.

• **No Panacea**—Common Market membership would not be a cure-all for Britain's economic troubles. Many people fear that British industry and labor would suffer from unrestricted competition with producers on the continent.

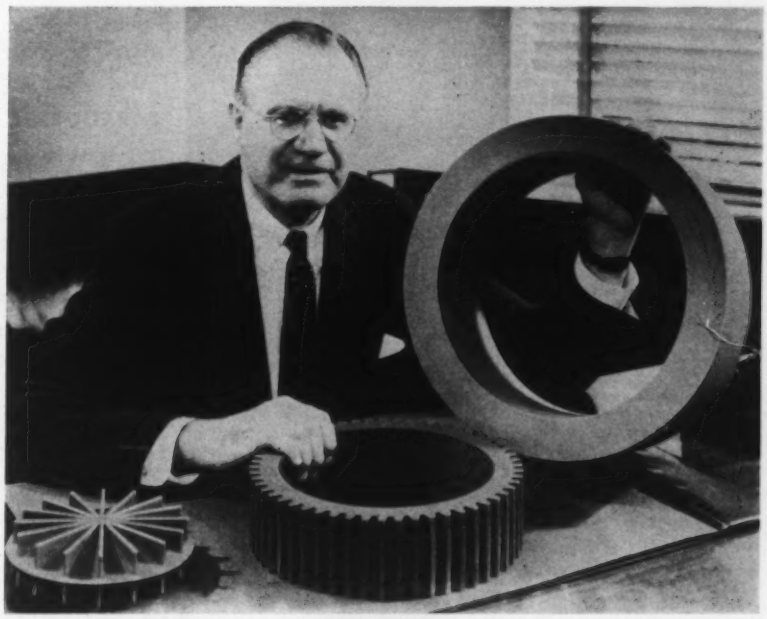
The UK will enter the Common Market only if the Treaty of Rome is modified in certain respects, or if certain concessions are granted to her. Two grounds for objection to the present treaty are:

1. The UK fears the political involvement resulting from EEC membership. She will not jeopardize her political sovereignty to grab at an economic advantage.

2. The UK cannot turn her back on nations of the British Commonwealth who enjoy preferential trade arrangements. They depend heavily on her as a market for agricultural products and raw materials. Australia, for example, ships one-third of her exports to Britain.

• **European Integration** — Should Britain enter the Common Market, she is likely to be followed by other EFTA members, such as Denmark, Norway, and possibly Portugal. Her EEC membership might be the start of an eventual merger of the two economic blocs.

Emile Benoit of the Columbia University Graduate School of Business says such a merger would have a diversionary effect on U. S. trade. "It would considerably increase the number of products on which we were exposed to intra-European competition . . . and always at a tariff handicap." Mr. Benoit points out two factors which would offset any adverse effects this might have on U. S. trade with Europe: European producers would probably concentrate on European markets, permitting the U. S. to acquire additional business elsewhere in the world. Integration would spur Europe's growth rate, creating a greater demand for products than Europe itself could supply.



Nylon Parts Getting Bigger, Cheaper

EXTRA LARGE nylon castings can be made cheaply and quickly with a new process developed by Polymer Corp., New York. It employs raw monomer which costs half as much as conventional polymer nylon. The product resembles a regular metal casting, says Polymer, and it is expected to make such castings competitive with metal types in metalworking equipment and papermaking machinery.

How to Make Meetings Pay Off

In studying thousands of meetings, James O. Rice (left) and Edward Malott Jr. conclude: In most cases, only a tenth of the potential is realized

Large Conferences

1. OVER-ALL

- Determine objectives of the meeting. Is it to present or share information? Or is it primarily a social gathering?
- Assign specific responsibilities.
- Integrate the sessions.
- Follow up to assure conformity to plan, to assignments, to deadlines.

2. CONTENT

- Find out what persons attending need. (Don't ask what they want; discover what their problems are and what is of concern to them.)
- Give speakers as much guidance as possible.

Smaller Groups

1. CONTENT

- Clarify the objective, and make sure it is understood. Don't, for instance, pretend that the group is to arrive at a decision when you are, in fact, going to make the decision yourself.

2. PROCESS

- Whenever possible, schedule meetings in advance.
- Where possible, circulate an agenda so participants can make adequate preparation. Allow opportunity for alteration of the agenda to gain greater participation.
- Make certain all those affected by the meeting are represented.

MANAGERS COMPLAIN that they have to attend too many unjustified, unproductive meetings. They're right, echoes James O. Rice Associates Inc., New York consulting firm.

Says Mr. Rice: "In terms of achievement of stated objectives, only a tenth of the potential of most meetings is realized. What distresses us is that so many hours are spent on meetings, but there is little attempt to build a rationale for doing them well. The tendency is to handle meetings at random in many companies."

• **First Step**—Most important, emphasizes Edward O. Malott Jr., vice president, is to determine the objective of a conference or meeting. These steps form the basic approach to getting the most out of meetings, he says:

- Clarify the purpose of the meeting.
- Evolve the subject matter.
- Determine the methods to be used.
- Plan the physical arrangements.

Among other basic functions, a properly planned meeting:

1. Provides "feedback" to the convener—he gets an almost immediate reaction to the content of the meeting.
2. Stimulates thought: The contribution of one member sparks contributions by others.
3. Helps lead participants who must implement a decision.
4. Allows a proposal or announcement to be made to several people simultaneously. The chance of distortion is minimized because there is an opportunity to clarify.

Outline the scope of their presentation. Acquaint them with the nature and interests of the audience.

3. PROCESS

- Don't distribute copies of a talk that is to be given verbatim.
- Make adequate provision for a question and answer session.
- Provide a change of pace through different forms of presentation: Lecture, panel, skit, film, discussion, etc.
- Provide at least some opportunity for genuine participation (but don't include a participative device just to be using it).
- Get feedback on how the meeting is going. That enables you to brief upcoming speakers on the climate of the session. It will show you how to improve on the next meeting.

4. HOUSEKEEPING

- Anticipate the audience's comfort needs (chairs, tables, ash trays, water, air conditioning, acoustics, etc.)
- Make sure visual aids are large enough and properly placed.
- Stick to the time schedule.

- Recognize two levels of the group's operation:
  a. Task level: Getting the job of the group done.
  b. Maintenance level: Facilitating relationships of the group itself for smooth functioning. That holds the group together, builds rapport among its members.
- Help members to assume responsibility for the group's progress.
- Avoid evaluative comments. If chairman is also the boss, such comments tend to inhibit creative discussion.

3. HOUSEKEEPING

- Anticipate the comfort needs of participants (enough room at the table, supplies, ventilation, etc.)
- Try to assure that there will be no interruption.
- Where appropriate, encourage the use of chalk board or chart pad for summary, clarification, or attention focus.

4. GUIDEPOSTS

- As chairman, avoid overcontrol of the meeting. Do not use the conference as a vehicle to show that you are "smart" or that you are "right."
- Recognize the existence of any blocks or barriers among individuals involved in the meeting and resolve them so that the group as a whole can be truly productive.

• **Two-Way Street**—Maximum participation is desirable. People can absorb just so much one-way communication. They don't want to be "talked at" throughout a conference.

Rice Associates, which plans and executes large conferences for companies and associations as well as offering business education techniques to firms, suggests a number of methods for gaining audience participation.

"We like to break large audiences up into subgroups for discussions," Mr. Malott says. "The time allotted is a matter of judgment. We tell our clients not to lecture on that which is or can be presented in written form."

Other techniques:

• Form "buzz groups." Rows face one another, exchange information, clarify points. "This way everyone has a stake in what's going on," Mr. Malott adds.

• Select a representative panel from the audience which will then quiz the speaker (or a spokesman for the panel may ask questions).

• Assign listening groups for particular areas of a talk. This method heightens interest in certain portions of a speech and helps develop better discussion later.

• **Prepare the Speaker**—Setting subject area boundaries for a speaker instead of "just telling him to talk" is important. It preconditions the speaker to develop explicit material. Subject gaps as well as overlaps are avoided.

"You raise the standard for performance for the entire meeting by

properly preparing speakers," Mr. Rice points out. If your program runs two days, second day speakers should be brought up to date on events of the first day. Tell the speaker what the audience has been especially interested in and what the general climate of the meeting has been."

Rice Associates says people at meetings often sit back and think: "All right, it's the chairman's show; let him run it!" (That reaction may stem from a long tradition of misused meetings.)

• **Effective Group Members**—A real contribution can be made to meetings, Rice Associates points out, by participants who:

• Share responsibility for seeing that the task and maintenance functions (see exhibit on small meetings) are done appropriately.

• Have the courage to express true feelings and encourage others to express theirs.

• Recognize the importance of timing and controlling their own contributions.

• Do not use the group for personal ends (to show off, or air grievances, for example).

Improvement, Rice Associates says, is not the result of fewer meetings but more effective ones. Progress requires:

1. Understanding of what can be accomplished via meetings.
2. Creating conditions that encourage accomplishment.
3. Developing participant skills.
4. Recognizing that success is the responsibility of all members, not merely a few.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, Ohio.*

Product Lines Serve as Meeting Props

AT Black & Decker Mfg. Co., Towson, Md., members of the product development committee use a backdrop of product lines to illustrate a point.

Considered one of the firm's most important conferences, the committee meets twice a month.

Members include the firm's top officers, plus marketing, engineering, and production executives.

Says Robert D. Black, chairman: "Meetings are primarily a matter of communications. The number necessary is a product of the size of an organization.

"We have more committees now but fewer meetings than we had three years ago. I believe the personnel at meetings should be kept to an absolute minimum."

A random survey of several Black & Decker managers showed that top executives spend as much as 75 per cent of their time in meetings, other executives 25 to 50 per cent.

What JFK's Defense Boost Means to You

METALWORKING'S stake in the extra $3.5 billion in defense appropriations sought by President Kennedy is a big one. If the request wins approval, the fiscal 1962 defense budget will come to about $47.5 billion—actual spending will be $46.6 billion.

Here are the major increases of interest to metalworkers:

• **Army**—The $552.4 million in additional spending includes: Tactical vehicles such as trucks and trailers, $175 million; aircraft, $36.7 million; Honest John missiles, $19.2 million; Nike Hercules, Hawk missiles, $14.6 million; combat vehicles (tank recovery and personnel), $98.2 million; ammunition, $87.3 million; small arms, $1.3 million; communications equipment, $97 million; construction and heavy equipment, $23.1 million. Additional funds will be for personnel, operations, and maintenance.

• **Navy** — The $543.6 million increase in hardware includes: Aircraft (fighters, patrol planes, helicopters), $281 million; missiles (Bullpup, Sidewinder, Sparrow, Tartar, Terrier, Talos), torpedoes, communications equipment, $262.6 million. In addition, other funds are requested for modernization of some ships with latest available equipment.

• **Marine Corps** — Procurement of ammunition and electronic equipment has been upped $67 million.

• **Air Force**—The $425 million in extra funds includes: Aircraft fighters, $211.5 million; airlift modernization, $82.6 million; missiles, $8.8 million; other hardware, $122.1 million.

The defense appropriation measure also carries a request for $448 million to speed up development of the B-70 bomber.

Aid to Education Climbs

DURING 1959-60, corporate aid to education increased 6.8 per cent, reports Council for Financial Aid to Education Inc. Since 1955, alumni gifts have risen 102.5 per cent, corporate gifts 96.8 per cent.

Profits Should Climb in 2nd Half

How Metalworkers Fared

(Net income)

	First Half 1961	First Half 1960
Allis-Chalmers Mfg. Co.	$4,758,932	$7,780,145
American Brake Shoe Co.	2,083,981	3,138,068
American Can Co.	20,339,000	17,342,000
American Machine & Foundry Co.	12,017,000	11,309,000
American Metal Products Co.	725,114	965,532
Amphenol-Borg Electronics Corp.	463,470	1,532,948
Anaconda Wire & Cable Co.	299,899	624,738
Apex Smelting Co.	437,683	531,166
Babcock & Wilcox Co.	9,985,898	9,236,599
Baldwin-Lima-Hamilton Corp.	518,898	1,120,603
Bath Iron Works Corp.	1,149,332	1,240,493
Bliss & Laughlin Inc.	596,248	1,440,990
Brunswick Corp.	11,048,902	9,296,109
Burroughs Corp.	3,185,250	5,043,000
Caterpillar Tractor Co.	27,258,989	20,378,447
Ceco Steel Products Corp.	969,736	523,332
Central Foundry Co.	669,559	696,021
Chicago Pneumatic Tool Co.	3,606,000	4,626,000
Chrysler Corp.	(a)15,700,000	23,700,000
Clark Equipment Co.	3,629,899	4,009,989
Cleveland-Cliffs Iron Co.	2,789,418	5,097,427
Cooper-Bessemer Corp.	1,278,574	2,300,255
Copper Range Co.	390,812	(a)494,934
Crane Co.	2,053,000	1,448,000
De Vilbiss Co.	674,775	1,110,978
Diebold Inc.	939,641	856,995
Douglas Aircraft Co. Inc.	3,225,118	(a)8,769,063
Electric Autolite Co.	1,562,302	4,734,713
Electrolux Corp.	1,913,301	1,637,281
Fansteel Metallurgical Corp.	731,179	1,264,763
Ferro Corp.	1,053,000	1,729,000
Foote Mineral Co.	136,510	423,666
Gabriel Co.	345,142	(a)126,801
General Cable Corp.	3,060,316	4,602,769
General Electric Co.	93,478,000	111,429,000
General Motors Corp.	440,459,843	611,584,358
General Telephone & Electronics Corp.	32,538,000	35,180,000
Hoffman Electronics Corp.	349,657	123,054
Hoskins Mfg. Co.	607,210	686,270
International Business Machines Corp.	100,859,439	76,616,285
International Silver Co.	1,002,400	915,300
Kaiser Aluminum & Chemical Corp.	10,645,000	11,737,000
Kawneer Co.	709,022	481,897
Kennecott Copper Corp.	36,281,898	42,660,746
Link-Belt Co.	2,089,035	2,883,519
Magma Copper Co.	4,193,750	2,676,701
Maytag Co.	5,695,466	5,652,661
Metal & Thermit Corp.	725,466	626,799
Minneapolis-Honeywell Regulator Co.	10,258,369	11,984,266
Monsanto Chemical Co.	34,587,000	38,363,000
National Lead Co.	22,548,867	25,296,609
Olin Mathieson Chemical Corp.	14,401,884	18,665,887
Porter (H. K.) Company Inc.	1,846,454	2,038,655
Radio Corp. of America	17,600,000	18,100,000
Republic Aviation Corp.	5,187,283	839,378
Revere Copper & Brass Inc.	3,923,104	3,831,305
Reynolds Metals Co.	11,271,000	13,218,000
Rheem Mfg. Co.	(a)141,332	489,964
Robertshaw-Fulton Controls Co.	1,644,661	1,737,672
Rockwell Mfg. Co.	3,156,000	3,747,000
Rockwell-Standard Corp.	5,157,781	8,355,718
St. Joseph Lead Co.	3,849,092	2,504,963
Searle, G. D. & Co.	4,581,606	3,894,154
Square-D Co.	5,026,642	5,356,217
Standard Pressed Steel Co.	1,100,000	2,185,000
Stewart-Warner Corp.	3,032,732	3,461,149
Studebaker-Packard Corp.	(a)8,840,172	3,359,585
Thew Shovel Co.	46,852	372,127
Thompson Ramo Wooldridge Inc.	2,071,337	5,033,861
Triangle Conduit & Cable Co. Inc.	145,377	624,542
Udylite Corp.	400,573	726,060
Union Carbide Corp.	69,395,000	81,192,000
United-Carr Fastener Corp.	895,101	1,923,385
Vitro Corp. of America	978,365	546,398
Westinghouse Electric Corp.	19,561,000	40,545,000
White Motor Co.	5,316,599	5,232,187
Worthington Corp.	2,848,466	3,786,562
Xerox Corp.	1,993,038	1,066,111

(a) loss

EXPECTATIONS for consumer spending, capital equipment outlays, exports and overseas activities add up to an optimistic outlook for second half profits.

Many metalworkers are anticipating record or near-record sales in the fourth quarter, following a seasonal slowdown in the current period.

Sales and earnings of most firms dropped below year ago levels in the first half. Second quarter business turned up, but the momentum was not sufficient for most metalworkers to offset their poor first quarter showings.

• **Steelmakers Recover**—Hard hit by the recession, steelmakers were among the first to benefit from the recovery. Second quarter profits were 2½ times those of the first quarter. Although sales were slightly below those of the year ago quarter, profits were lifted about 10 per cent by cost cutting and modernization programs.

Steelmakers still have a long pull to the January-June 1960 level. During the first half, sales were only 75 per cent as high, and earnings were chopped to about 50 per cent.

Steelmakers' Profits Slide

(Net income)

	First Half 1961	First Half 1960
Acme Steel Co.	$400,171	$2,620,916
Alan Wood Steel Co.	(a)73,981	1,205,145
Armco Steel Corp.	23,176,168	41,733,219
Bethlehem Steel Corp.	33,967,877	81,543,035
Colorado Fuel & Iron Corp.	367,585	2,414,432
Continental Steel Corp.	2,280,059	2,308,642
Copperweld Steel Co.	400,783	2,253,518
Crucible Steel Co. of America	(a)1,495,000	3,034,143
Eastern Stainless Steel Corp.	1,202,709	1,225,666
Granite City Steel Co.	4,537,805	7,644,551
Inland Steel Co.	21,749,580	33,067,503
Jones & Laughlin Steel Corp.	11,827,000	26,136,000
Kaiser Steel Corp.	5,206,000	6,874,924
McLouth Steel Corp.	7,167,451	9,675,307
National Steel Corp.	16,164,166	27,301,361
Pittsburgh Steel Co.	(a)1,455,241	2,405,194
Republic Steel Corp.	21,253,878	41,408,483
Sharon Steel Corp.	(a)261,639	1,954,856
U. S. Steel Corp.	91,004,141	193,472,241
Universal-Cyclops Steel Corp.	2,100,440	3,120,826
Wheeling Steel Corp.	1,717,000	8,156,000
Youngstown Sheet & Tube Co.	10,843,270	18,889,010

(a) loss

"We had 18-20 hours downtime every time we changed heats. With strip, we just hook on from heat to heat. No downtime."

"With strip we use smaller blanks to produce the same part."

"By using strip we save downtime, die repairs."

"Rejects have drooped from about 8% to less than 1%."

"We found we couldn't afford the low cost of sheet."

Read why Target Stamped Products, Inc., Kinsman, Ohio, switched from strip to sheet—and then back to strip. Comments are Harvey Haynman's, Target's president:

"We thought we'd give sheet a try back in 1958. The low cost looked too good to pass up. Today, you'd have a hard time finding a piece of cold rolled sheet around the shop.

"We were absorbing 18-20 hours of downtime every time we changed heats. With strip, we just hook on from heat to heat. The characteristics are the same from heat to heat and coil to coil. We don't waste time adjusting our dies.

"Strip saves us metal. We can use smaller blanks to produce the same part. I'd say we save from 1/16" to 3/32" of metal per part. That's a lot of steel when you're turning out 25-30 million parts a year.

"We don't have gauge problems now. The strip we buy is always rolled within our working tolerance. We work to a plus or minus .0025 inches.

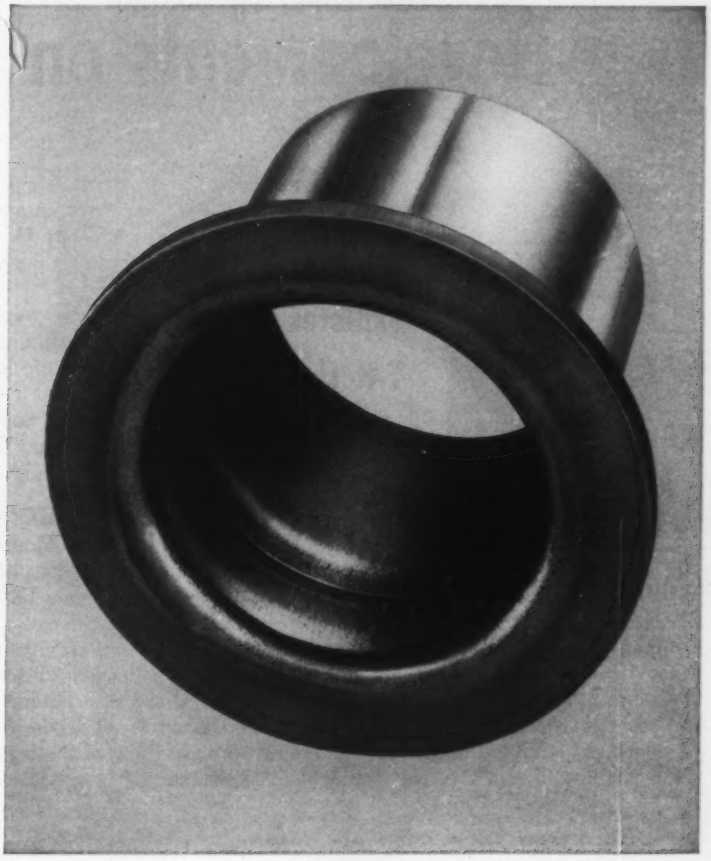
"So far, strip hasn't given us lamination troubles. It doesn't take much lamination to give you big trouble in a deep drawing operation. When the metal separates, part may stick to the punch while part stays in the cavity. As another blank transfers to the same station, there's a double smash and the die is ruined. That hasn't happened with strip. Saves a lot of downtime and die repair.

"Strip takes a deep draw without thinning out on you. Its uniform temper pays off when you're turning out Silent Blocks where both the ID and OD have to be right or the part's a reject.

"All in all our rejects have dropped from about 8% to less than 1% since we switched back to strip.

This mark tells you a product is made of modern, dependable Steel.

Outer metal bushing of a Silent Block. Target Stamped Products turns out millions of these each year for the auto industry. Silent Blocks are used in the suspension systems of all American cars—about eight to a car. To produce the piece, Target must work to a plus or minus .0025" tolerance or the Silent Block won't work. When Target switched back to strip, their rejects dropped from about 8% to less than 1%.



"You can have all the automation in the world, but if you're using the wrong steel, it just nickels and dimes you to death. With strip our machines keep working; we need less supervision, less tool repair. Our trim is small and our percentage of rejects is the smallest we've ever known. We found out we couldn't afford the low cost of sheet. That's why we're back with strip."

The switch is back to strip

Cold rolled sheet steel can be your best buy on a cost per pound basis. Certainly its quality has risen sharply since the war. But, pound cost is only part of the story. If you really need steel tailored to your specific production requirements, cold rolled strip is the answer.

Strip is not sold on an as-rolled basis. What you buy is a specific chemistry, temper, dimension, edge and finish to precisely meet your fabricating and end-use requirements.

American Steel and Wire has over 12,000 mill practices in available strip specifications. Many of your processing steps may actually be eliminated by using cold rolled strip.

Take a hard look at your production line and let our salesmen look with you. Check your rejects, your downtime, your scrap rate. Perhaps you can improve the quality of your product and cut production costs at the same time, with *tailored-to-the-job* cold rolled strip from American Steel and Wire. American Steel and Wire Division, Rockefeller Building, Cleveland 13, Ohio. USS and American are registered trademarks

American Steel and Wire Division of United States Steel

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
Tennessee Coal and Iron Division, Fairfield, Ala., Southern Distributors
United States Steel Export Company, New York, Distributors Abroad

Two Developments on New Frontier

Labor secretary explores possible T-H changes

THE ADMINISTRATION intends to press for revisions in the Taft-Hartley Act in the next session of Congress. Last week, Labor Secretary Goldberg convened 19 lawyers, arbitrators, and college labor experts to explore proposed changes.

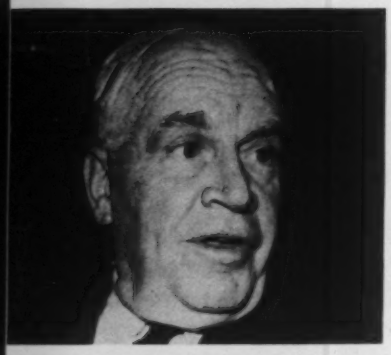
A special subcommittee of the President's Labor-Management Committee is also studying proposed changes and will report to the President in September.

Labor sources agree that President Kennedy will not seek compulsory arbitration, but he will insist on more White House tools to use in prying a settlement out of labor negotiations before a crippling national strike occurs.

He wants the tools to include the power to set up fact finding boards which can make recommendations (technically they do not make recommendations under present T-H provisions).

He wants the right to seize key industries and to use the "cooling off" periods without approval from the courts.

● **RETRAINING PROGRAM PROGRESS** — Senate and House Labor committees have approved different versions of the administration's retraining bill, so there seems little doubt a program will pass this session—it'll cost up to $300 million and run up to four years. Participants might receive a maximum of $32 per week for 26 weeks. Secretary Goldberg reports it is "unfortunate" that the moving allowance may not receive Congressional approval. He reports that upon passage of the legislation, the new Office of Automation will be "upgraded" to bureau status with an enlarged staff.



Secretary Hodges trains sights on exports, imports

REORGANIZATION of two important sections of the Commerce Department may give Secretary Luther Hodges the policy making role he has sought since entering President Kennedy's administration. Involved are the Business & Defense Services Administration (BDSA) and the Bureau of Foreign Commerce (BFC).

Most important to the secretary is a planned split of the BFC into two sections, one for planning, one for operations. The operations end will include many of the statistical functions and routine jobs of the BFC, including the administration of the Export Control Act.

The new planning end of BFC will be headed by a well known (to metalworkers with overseas interests) executive who has some new ideas for the export expansion program.

Shifts within the BDSA will involve the consolidation of some divisions, but most important, a new marketing and research division will be created to promote industrial growth here at home. In the new setup, the BDSA marketing group and the BFC planning group will be working closely together to develop new approaches to the problem of protecting domestic interests while expanding overseas interests.

BDSA will be streamlined to this extent: Three main divisions will be established along the lines of finished products, raw materials, and other industrial segments. Each major divisional section will report to an assistant administrator of BDSA. In the past, each of the 25 BDSA divisions has reported directly to the administrator.

Observers are enthusiastic about the new planning-marketing section of BDSA, claiming it will give the Commerce Department the sort of "forward looking" role that has been needed for years in an era of exploding technology.

A big new market is born . . .

Sweet Water From Salty Seas

'Can Transform the Way of Living'

In an exclusive interview, Interior Secretary Stewart L. Udall tells STEEL that water desalinization "is one of the keys to solving the nation's water problems"; that it "is one of our most fruitful areas for assistance abroad"; and that "it can transform the way of living for people in areas that suffer from fresh water shortages, of which there are many in this country." He adds:

"By 1970, unless important steps are taken to conserve water and use it more efficiently, more and more communities and industries will face serious water problems."

He points out that we must "first look at the water problem in a rounded way. There is a tremendous amount of water now being wasted. If it were used efficiently, we could double our supply. But that would require much sounder water management." He notes that the U. S. needs to do much more research in evaporation control and water pollution.

"For the long haul," says the secretary, "desalinization is one of the keys to solving the problem. It will be especially important in areas that suffer from brackish water and along the seacoasts. It will play an important role throughout the nation.

"But we have much to learn about the technology of desalinization, just as there is much that we need to know about the basic properties and behavior of water. Private industry has a tremendous role. Its ability to improve methods and bring the costs down to the point where prices will make desalinization economically feasible is the key to the success of the program." Mr. Udall suggests that the "government will act as a midwife" in the birth of an important new industry.

He asserts: "With water shortages of a magnitude that could conceivably restrict our economic growth, we must unrelentingly press for the development of all our available water. Anything less than total development will not be enough."

IN A CHICAGO suburb, a housewife turns the water faucet and gets a mere trickle . . . In west Texas, a rancher, his eyes reddened by heat and dust, squints nervously at vultures over water-starved cattle . . . In Southern California, an entire family is hospitalized with hepatitis; they drank from a polluted stream.

Such things happen in the U. S. every year. They are symptomatic of the nation's shortage of fresh water. In some areas, the problem is 15 or 20 years away; in others, it is urgent now. During 1957, for example, 1000 U. S. communities were forced to restrict the use of water.

Giant New Industry

Many avenues are being explored to solve the water problem—underground storage, education in conservation, more effective controls against pollution, methods for reuse, reclaiming of sewage, evaporation control, even artificial rainmaking. But, over the long pull, the most promising method appears to be tapping potable water from the seas. This field of technology will give birth to a giant new industry.

More than 100 U. S. organizations, and numerous groups abroad, are doing research, developing processes, designing, building, and operating plants for water desalinization. At least $5 million is being spent in the U. S. this year on research and development.

The staff report of the House Committee on Science & Astronautics (submitted to Congress Mar. 10) asserts: "It is likely that the U. S. will be the first of the highly civilized, technologically advanced nations to find itself in real

difficulty due to fresh water shortages; that this difficulty will materialize as much as ten years earlier than the 1980 date set by most prognosticators—that is, by 1970 or before—and that the nature of our water needs will be severe enough to make the conversion of salt water a major commercial venture within 15 or 20 years."

Westinghouse Electric Corp. estimates the market for desalted water at 300 million gallons daily by '70, 600 million by '75, and 1 billion gallons daily by 1980. Bjorksten-Texas Research Co. expects the 1980 figure to be 2 billion gallons daily.

While some researchers brand those figures as "optimistic," even more fantastic predictions are being made. The House committee report contends: "Within 15 years, it is estimated that there will be markets for at least 100 billion gallons of converted water per day, and that during the interim, $10 billion to $20 billion will have to be expended on new conversion plants."

Adds F. W. (Pat) O'Meara, staff director of the Interior Department's Office of Saline Water: "It's conceivable that, by 1980, we'll need 85 billion gallons of converted fresh water per day in the U. S. By then, we'll need about 600 billion gallons of water daily—only 515 billion are available."

Big Market for Metalworking

Even if you accept conservative estimates, this new industry will mean a big new market for a wide range of metalworking plants. STEEL asked 30 firms making conversion equipment what materials and components they will be buying. Among the answers: Stainless steel, Monel, aluminum, Hastelloy, steels clad with noncorrosive metallics and nonmetallics, cupro-nickel alloys, carbon steel (including A-285), copper bearing steels, structurals, steel and nonferrous pipe and tubing (including plastic lined pipe, pumps, valves and fittings), drives, controls, motors, compressors, turbines, tanks, instrumentation, filters, fasteners, evaporators, diesel engines, plates, condensers, gasoline engines, heat exchangers, glass, plastic film, plastic pipe, valves and fittings, and boilers.

As an indication of the size of the market, Weir Chicago Bridge Inc. used 350 tons of steel plates in building a plant which produces 1 million gallons of fresh water daily. Another 100,000-gallon-per-day plant used 8 miles of aluminum tubing and 50 tons of steel sheets and plates.

Why the Market Will Grow

The U. S. will feel the need for salt water conversion because of a combination of trends that strain our present resources—a rapidly growing population, a high standard of living that depends on voluminous water use, swift industrial expansion that not only requires more water but tends to pollute existing resources, and a large part of our terrain that is arid and must have water to be productive.

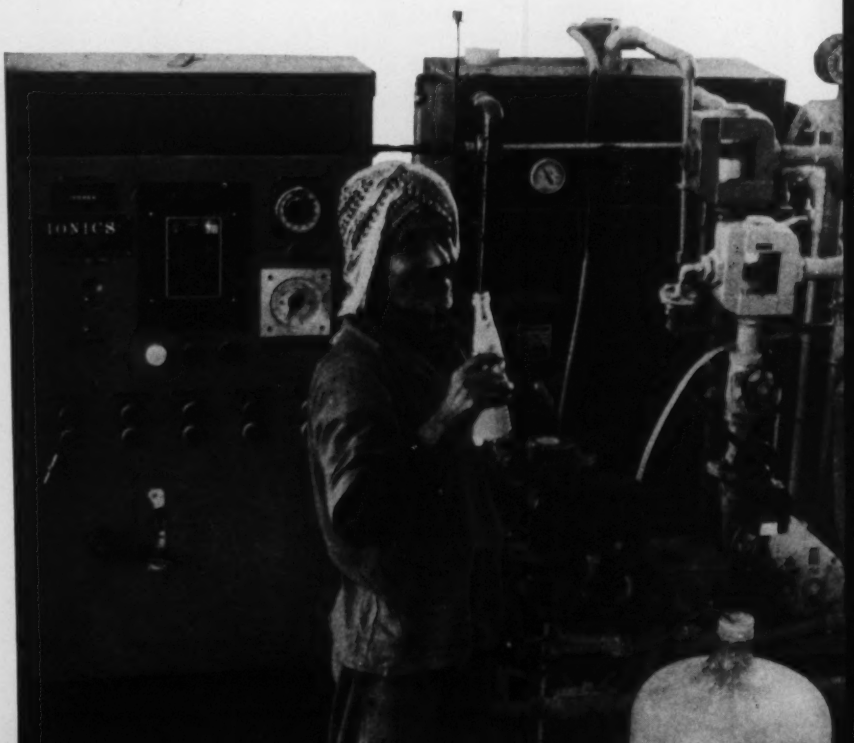
New household products—dishwashers, automatic washing machines, garbage disposers, swimming pools—are pushing the per capita usage figure upward.

There is also a theory that the U. S. is subject to alternating decades of relative wetness and drought. Within that context, we're in a wet cycle—and will enter a dry cycle in 1971 or thereabout.

Top Export Potential

While the U. S. market for desalinization looms large, it may well be dwarfed by the export market. For example, 60 of the 100 underdeveloped countries associated with the United Nations suffer water shortages that can probably be solved only one way: Salt water conversion. Among areas desperate for water: Israel, Egypt, Iraq, India, Pakistan, Ceylon, Algeria, other parts of North Africa and Latin America. Many islands, such as Bermuda, are perennially or

Water for beverages in Bahrein
Merrill Lynch, Pierce, Fenner & Smith Inc.



periodically faced with water shortages. Western Australia is a virtual desert. Brackish water is a serious problem in parts of Mexico and Argentina. On more than one-third of the earth's land surface, people seldom see a raindrop.

So the U. S. is in a strategic position to reap more than material benefits if we produce the first efficient system for converting sea water to fresh. In an era of rising nationalism and a world in which the majority of nations need water to cultivate their land, feed their industries, and raise the living standards of their people, cheap ways of producing fresh water would be invaluable builders of international good will and prestige.

An investment of, say $6 million, could transform a dry area into a manmade oasis. Such a plant could be a permanent monument to the scientific leadership and good will of the U. S.

Foreign R&D

Studies of salt water conversion have been undertaken in more than 30 countries. Japan is doing considerable work.

Under an Organization for European Economic Co-operation program, eight nations jointly conducted conversion research. Five—the United Kingdom, Netherlands, France, Australia, and South Africa —carried the financial load, while three—Israel, Greece, and Pakistan —contributed knowhow. The program has been completed, and a semiprivate group of conversion equipment manufacturers (International Salt Water Development Group) has grown out of it.

Work on improving solar distillation is progressing in Morocco, Italy, Spain, Australia, and Algeria, as well as the U. S. Solar stills are in use in Malta, Cyprus, Greece, and Algeria.

The Cost Trend

The cost trend is encouraging. Only a decade ago, $5 was about the minimum cost per 1000 gallons of converted fresh water. Today, costs range from around $1.75 per 1000 gallons to less than $1—depending on size of plant, salinity of the water, and cost of power. Industry authorities are projecting costs of 30 to 70 cents for 1965.

In some areas, the water shortage is so severe that conversion is practical at costs above $1 per 1000 gallons. But for widespread use, the costs would have to be brought below 50 cents. Success seems likely. A STEEL survey finds many firms in the field suggesting costs of 40 to 50 cents per 1000 gallons for 1965. Bjorksten-Texas Research Co. says "a realistic goal for 1965" is 30 cents. Food Machinery & Chemical Corp. expects to drive costs down to 40 cents per 1000 gal-

How Much Water Do We Need?

The amount of water used daily in the U S. would stand a foot deep over all of Rhode Island. Use has soared from 40 billion gallons daily in 1900 to around 320 billion today—and will exceed 450 billion by 1975. Here are some typical requirements . . .

32,000 gallons per ton of steel ingots.
30,000 gallons per ton of primary aluminum.
3,750 gallons per pound of beef.
37 gallons per slice of bread.
660,000 gallons per ton of synthetic rubber.
240,000 gallons per ton of newsprint.
250 gallons daily per bed in hospitals.
120,000 gallons daily per office of 4000 persons.
550 gallons daily per family of four for household uses.
200,000 gallons to produce a ton of rayon fiber.
7 gallons to produce 1 gallon of gasoline.
15 gallons to produce one serving of potatoes.
236 gallons to produce a gallon of alcohol.

The above numbers are averages. Usage varies greatly. Example: The production of 1 ton of steel can take up to 70,000 gallons of water.

Household desalting in Texas
American Machine & Foundry Co.

lons by 1965. At that cost, it forecasts a $2 billion annual equipment market in the U. S., plus a $500,000 export market. W. L. Badger Associates Inc., predicts a cost of 40 cents per 1000 gallons by '65, sees a domestic market to convert 100 million gallons daily by then, plus an export market of 1 billion gallons per day.

From conventional sources, water for irrigation purposes costs 10 to 15 cents per 1000 gallons. For municipal and residential uses, the cost runs from 20 to 45 cents per 1000 gallons. For industrial purposes, the cost may be low, if its only purpose is cooling, or considerably higher (50 cents to $1.50) if high purity is necessary. But most contemporary water supply systems are old and reflect original costs that are considerably below today's cost of developing new sources.

Technology Improving

Salt water conversion is older than the teakettle. Aristotle taught that "salt water when it turns into vapor becomes sweet." Egyptians carried water from the river in camel skin bags and transferred it to earthern jars, then crushed sweet almonds and plunged them up and down in the water to clarify it. Sanskrit lore dating from about 2000 B.C. advises that "foul water" may be improved by "boiling and dipping seven times into a piece of hot copper," then filtering it. Thomas Jefferson, while secretary of state, gave Congress a report on sea water conversion.

In water-short areas abroad, sea water desalting plants date back as far as 1728. It has been a growing business since the 1940s. Aqua-Chem Inc., a pioneer in the field, has built more than 4000 units—many for shipboard use. Government sources report that overseas conversion capacity already exceeds 30 million gallons daily. Westinghouse Electric Corp. has installed a daily capacity of 5.2 million gallons in the Kuwait area alone.

With the spur of federal funds, technology is improving rapidly. The Office of Saline Water, established in 1952, has been budgeted $10 million for research and $10 million for the construction of demonstration plants. It's likely that more money will be forthcoming. As Mr. O'Meara puts it: "It's ridiculous that we should try to operate on roughly the same amount of money as the Washington Zoo."

The Office of Saline Water has sponsored extensive research on conversion methods as well as related problems like corrosion, heat transfer, scale prevention and removal, membranes, and the basic chemistry of water.

Basically, there are only two ways to make salty water sweet: 1. Take the water out of the salt. 2. Take the salt out of the water. Using the first approach, most companies are concentrating on variations of two methods—distillation and freezing.

The majority of work employing the second approach has been in electrodialysis.

Work is also being done on vapor, ion exchange, hydrates, and osmosis systems.

At least five companies are studying household units. American Machine & Foundry is test marketing a unit (see photo on Page 43). Aquastills is marketing a machine to convert 500 gallons per day. It uses 55 to 75 kw-hr of electric current to turn out 1000 gallons.

STEEL will supply, on request, a bibliography of technical reports.

A Victory for Humanity

It will be a major victory for the forces of democracy, and for all humanity, if the U. S. rapidly puts itself in a position to export low cost conversion units to the arid regions of the world. We would win the gratitude of the uncommitted and newly developed nations, contribute immensely to an expanding world economy, and gain both in prestige and material values.

Practical salt water conversion means the ability to reclaim lost areas for agriculture and to attract industry into new regions. It offers a growth opportunity to communities that are now stifled by water shortages. For industry, it means an expansion of available locations, the attainment of reliable water supplies for numerous new processes, and the opening of a giant market for equipment around the world.

Says David Karr, president, Fairbanks Whitney: "This generation will be remembered for turning the sea into a well that never runs dry."

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.*

Who's Who in Conversion?

At least 50 U. S. firms are actively engaged in research, development, or production in the salt water conversion industry. An additional 30 or more universities, research organizations, and individuals are doing research. Among the important companies active in the field:

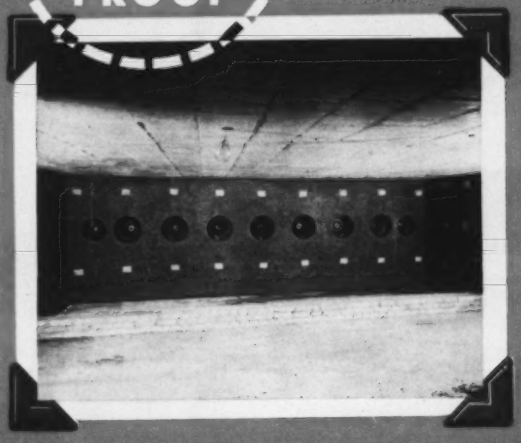
American Machine & Foundry Co.'s Maxim Div., New York; Aqua-Chem Inc., Waukesha, Wis.; Aquastills Inc., Rochester, N. Y.; Austin Co., Cleveland; Babcock & Wilcox Co., New York; Badger Mfg. Co., Cambridge, Mass.; Badger (W. L.) Associates Inc., Ann Arbor, Mich.; Battelle Memorial Institute, Columbus, Ohio; Bjorksten-Texas Research Co., Houston; Blaw-Knox Co., Pittsburgh; Carrier Corp., Syracuse, N. Y.; Catalytic Construction Co., Philadelphia; Cooper-Bessemer Corp., Mt. Vernon, Ohio; Cornell University, Ithaca, N. Y.; Curtiss-Wright Corp.'s Princeton (N. J.) Div.; Dow Chemical Co.'s Texas Div., Freeport, Tex.; E. I. du Pont de Nemours & Co. Inc., Wilmington, Del.; Electric Storage Battery Co.'s Yardley, Pa., research center; Fairbanks, Morse & Co., Chicago; Ferguson (H. K.) & Co., Cleveland; Fluor Corp., Los Angeles; Food Machinery & Chemical Corp., San Jose, Calif.; Franklin Institute, Philadelphia; General Electric Co., Schenectady, N. Y.; Georgia Institute of Technology, Atlanta; Grace (W. R.) & Co.'s Research Div., Clarksville, Md.; Griscom-Russell Co., Massillon, Ohio; International Nickel Co. Inc., New York; Ionac Chemical Div., Birmingham, N. J., Pfaudler-Permutit Inc.; Ionics Inc., Cambridge, Mass.; Kellogg (M. W.) Co., New York; Koppers Co., Pittsburgh; Little (Arthur D.) Inc., Cambridge, Mass.; Lummus Co., New York; Monsanto Chemical Co., St. Louis; North American Aviation Inc.'s Rocketdyne Div., Canoga Park, Calif.; Radiation Applications Inc., New York; Resources Research Inc., Washington; Scientific Design Co. Inc., New York; Southern Research Institute, Birmingham; Southwest Research Institute, San Antonio, Tex.; Stearns-Roger Mfg. Co., Denver; Struthers Wells Corp., Warren, Pa.; Aeronautics Div., Dallas, Chance Vought Corp.; Weir Chicago Bridge Inc., New York; Whiting Corp., Harvey, Ill.

HERE'S UNRETOUCHED PROOF

. . . in rail and billet reheating furnace at

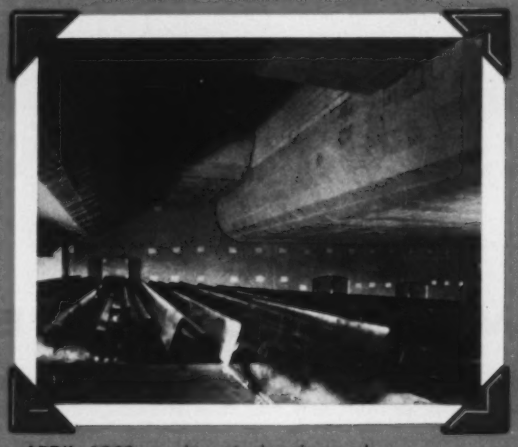
INLAND STEEL

Plibrico plastic refractory lining shows how it can take punishment



APRIL 1960 . . . view shows front burner wall of rugged, shock-resistant Plibrico Super "F".

TODAY . . . unretouched photograph of same area shows how Plibrico Super "F" withstands punishment in this high heat zone.



APRIL 1960 . . . view at charging end shows sidewall and flared doors also formed with Super "F", a grade for high heat conditions.

TODAY . . . unretouched photograph illustrates Plibrico's tight, stable monolithic lining of Super "F" after almost one year in service.

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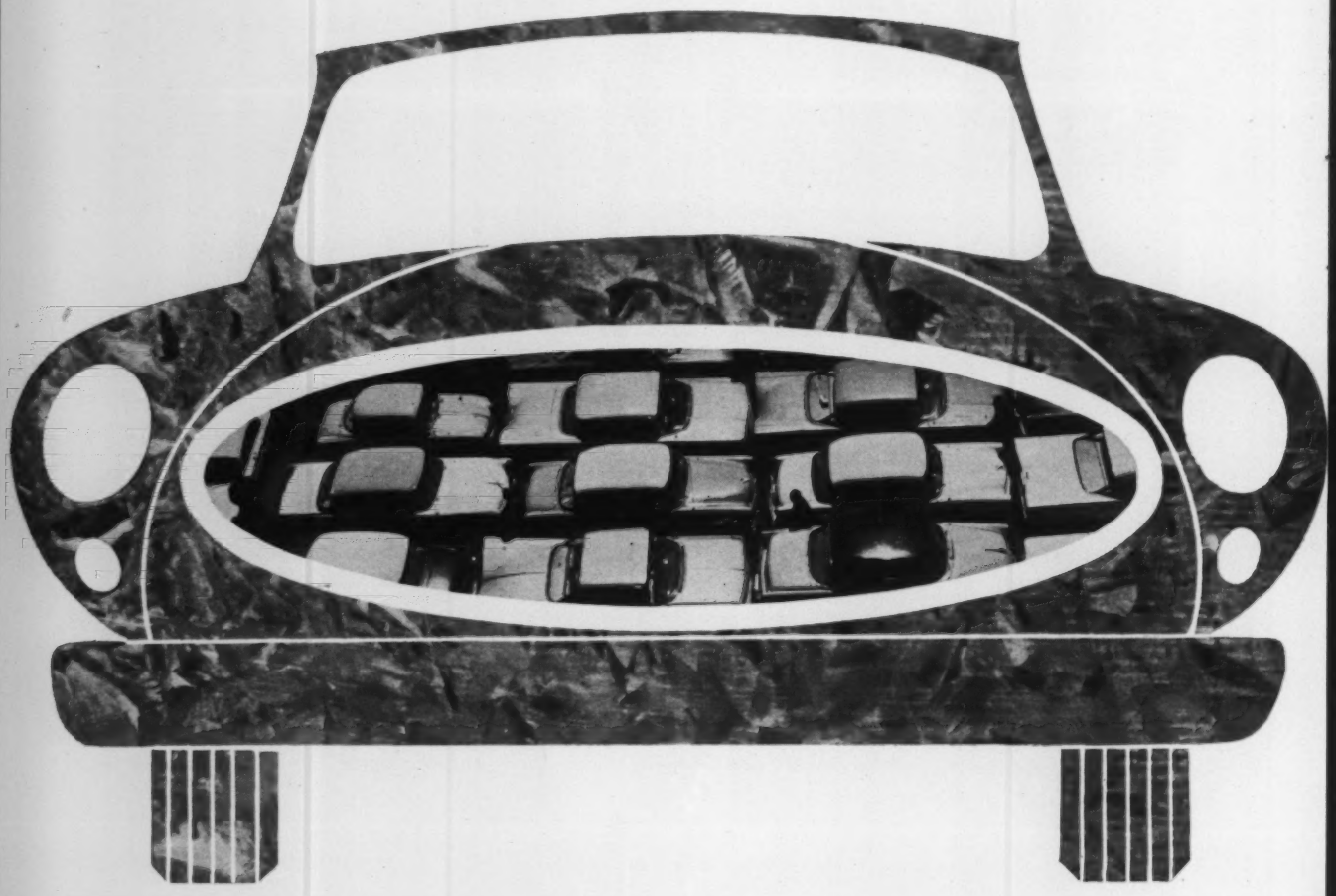
More parts in more new cars fend off corrosion . . .



GUARDED BY GALVANIZED STEEL

In 1960 the Motor City consumed a massive 218,964 net tons of galvanized steel sheets to fight car corrosion. That's 38% more than was used in 1959 and over 700% more than in 1954.

In the average compact car, for instance, Detroit now uses over 100 pounds of corrosion-resistant galvanized steel sheets. The results are numerous and notable: Car owners are getting greater durability and a sharp drop in maintenance costs and headaches. Manufacturers are getting the cost reductions inherent in galvanized steel's simplified fabricating procedures. Head and tail lamp housings, for instance, formerly required five or six steps when zinc plated or painted after stamping. Now they are moved direct from press to assembly line with their tight zinc coatings completely undamaged by fabrication. The same economies apply to side members, rocker panels, front and rear rails and cross members.

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Autodom's Challenges in the '60s —No. 4

Last in a series, this article points up the marketing challenges automakers face in the next decade.

Marketing Executives Set Their Goals

Wants to satisfy customer demands . . .

THE CHALLENGE the automobile industry faces in the next ten years is a continuation of the same forces we have perceived in the past.

As this country's highway system progresses and urban development continues, the needs of our residents must be geared more and more to extreme mobility. Personalized transportation will become increasingly vital. There will be a need for more than one car in many families.

The buying trend caused by those factors should continue at an increasing rate.

It is anticipated that gross national product will increase by 40 per cent to surpass $700 billion by the end of the decade. Spendable income is likely to grow by more than 15 per cent. The population should increase by 33 million with more families moving to suburban areas. By the end of the period, annual automobile sales should exceed 8 million with vehicle registrations 36 per cent above today's level.

The challenge to the industry is to anticipate and satisfy increased customer demand through a quality dealer organization and to sell and service products efficiently in the expanding market.

JAMES M. ROCHE
Vice president-distribution
General Motors Corp.

Sees more models—shorter model runs . . .

ALTHOUGH the change is not abrupt, we already have observed signs of a growing demand for variety and quality in the automobile market place.

I believe the key to selling cars and trucks in the 1960s will be flexibility in meeting a changing market and success in achieving new levels of quality.

There has been a wide awareness that the "war babies," now becoming consumers in their own rights, guarantee an expanding market. But just as important is the double multiplier: Customers of the 1960s will not only be more numerous, but more prosperous.

The customer with a rising level of income is more demanding, more knowing. He wants greater variety available to let him express his individuality.

The growing demand for variety and quality will make itself felt at both the manufacturing and retailing ends of the automobile business.

First, I believe the size of dealerships will increase. It's a simple matter of arithmetic. While average annual retail passenger car sales are expected to rise to about 7 million units by 1970, we do not expect a commensurate increase in

CHARLES R. BEACHAM
Vice president-marketing
Ford Motor Co.

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the number of dealers.

Second, there seems to be a trend toward dealers handling a complete range of price lines. Because we believe the franchise system will continue, each manufacturer or each automotive division will tend to produce a more complete price line. However, due to more proficient market forecasting, more efficient scheduling, and faster delivery, I believe dealers will be able to maintain their present inventory levels in spite of greater volume and more complete product offerings.

For the manufacturer and its suppliers, the impending changes in car marketing mean new emphasis on speed, flexibility, and new products. Because of the rapidity of change, there are likely to be shorter model runs, but greater opportunity for new techniques and new materials.

Claims compacts will dominate market . . .

ROY ABERNETHY
Executive vice president
American Motors Corp.

MARKETING automobiles during the 1960s will call for sound judgment as the compact car market continues to expand and eventually dominates the market place. We will see a shift in marketing techniques and approaches as compact car competition heightens. The balance between family size interior room and comfort, sensible performance, and over-all economy will be the keynote of car marketing.

Emphasis will also be placed on the functional aspects of the automobile, such as ease of handling, parking, and maneuverability. Car appearance and styling will continue to be important factors but the real consideration will be on consumer benefits and real improvement in the product. Another selling point—product quality—will continue to be improved and stressed to a greater degree.

Sales training programs will be geared to educate the consumer on the need for styling stability to improve product quality and develop greater automobile safety and longer life.

Dependable dealer service and training service personnel will become an increasingly important adjunct of marketing plans.

Charges old marketing goals are reversed . . .

LEWIS E. MINKEL
Vice president-marketing
Studebaker-Packard Corp.

THE AGE OLD GOAL of marketing has been reversed in the automobile field. Formerly, the goal was to sell what was made. Today, we must make what will sell.

Cars and trucks designed to meet changing social conditions and the utilitarian needs of specific population groups will be the most significant marketing development during the coming decade. The change began with the compacts. It will gain momentum.

Formerly, the automobile was a luxury and a status symbol. Now, it's a necessity for most people. Almost every activity in daily life (from drive-in restaurants to drive-in banks) has been adapted to serve the motorist while public transportation facilities have declined. In addition, the tremendous growth of recreational products and services is competing with the automobile for the consumer dollar more strongly than ever before.

Meanwhile, the "population explosion" will be occurring. Teen-agers will require cars for attending school. Young married couples will need cars for suburban living. As children grow up, families will increasingly require two, three, or more cars.

The decade of the '60s will see a closer alliance between manufacturers and their dealers in providing maximum service at the lowest possible cost.

U. S. Auto Output

Passenger Only	1961	1960
January	415,857	688,690
February	364,385	659,298
March	407,959	654,241
April	446,739	582,869
May	542,303	611,260
June	559,474	613,136
July	402,400†	434,377
7 Mo. Totals	3,139,117	4,243,871
August	.....	305,514
September	.....	407,691
October	.....	617,972
November	.....	597,638
December	.....	523,422
Total	.....	6,696,108

Week Ended	1961	1960
July 1	125,297	125,868
July 8	85,889	89,769
July 15	127,157	105,113
July 22	102,875	112,179
July 29	75,235†	107,019
Aug. 5	35,000*	103,504

Source: *Ward's Automotive Reports.*
†Preliminary. *Estimated by STEEL.

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Needed: More Consumer Spending

THE GROUNDWORK is laid for a vigorous charge into record high economic territory in the late third and early fourth quarters. It's up to the consumer now. He will have to exercise more of his purchasing power than he has so far in the recovery period.

• **Where We Stand** — Although some businesses—especially in metalworking—have not felt the uptrend as much as others, even the most pessimistic observer has to admit that the over-all economy has climbed up to the record level of early 1960. The Federal Reserve Board's industrial production index was at 110 (1957=100) in June, and the smart bettors say that July's figure is at least as good—maybe a point better.

The President's Council of Economic Advisers says that the gross national product in the second quarter stepped up to an annual rate of $515 billion compared with $500.8 billion in the first quarter. Every major component except net exports contributed to the gain.

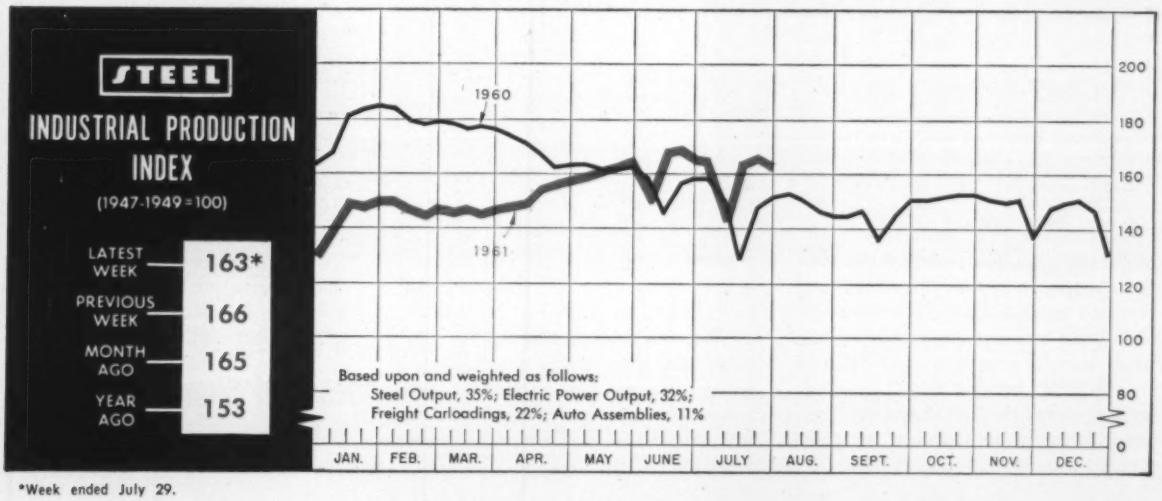
Several other indicators of the total business position are at previous highs, but there is a strong suspicion, supported by some reliable statistics, that the consumer is not contributing as much as he might in this recovery—especially in regard to durable goods.

• **Purchasing Power at Peak** — There still seems to be a feeling of uneasiness about the immediate future. Also, the consumer may be changing his spending pattern. There is little question that he has the buying power to trigger a full fledged boom. Personal income in June was at a record annual rate of $416.7 billion. It undoubtedly advanced again in July.

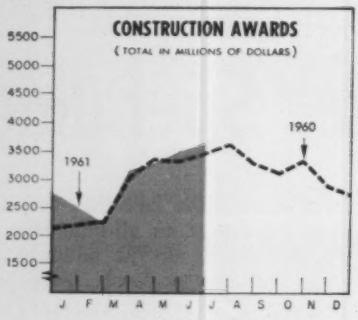
Net spendable earnings also reached record levels in June, climbing to $83.74 a week for a production worker with three dependents. That is 2.5 per cent higher than the year-ago month. In addition, buying power has climbed almost 2 per cent because of nearly stable prices in the same period. Both hourly wages and the workweek are climbing, so unless runaway inflation sets in this fall, the worker's financial position should improve further.

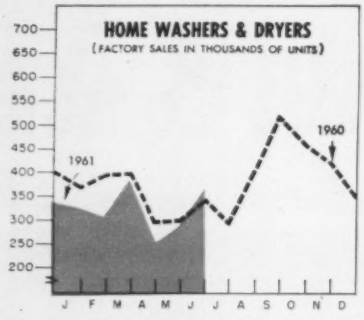
• **Liquid Position** — Further evidence that spending is not as great as it might be expected to be in a recovery is the fact that personal savings are at an all-time high of $25.7 billion, up $2 billion from the first quarter level. And consumer credit has been lagging. Total outstanding credit of $54.4 billion in May had barely regained a not too satisfactory February position. The main category—installment credit—was still below the February level. Part of the lag can be traced to only moderate auto sales during the first half. Combining rising income, record savings, and available credit, the consumer is in a better position to buy now than at almost any other time in recent years.

• **Freezing the Assets**—But government figures show that consumer spending generally is picking up slower than other areas of the economy. Says the Office of Business Economics (OBE), Department of Commerce, in the July *Survey of Current Business*: "The principal weakness (in demand for final products) has been in consumer demand for durable goods, and here an appreciable rise in total purchases has occurred since the beginning of the year . . . In relation to income, however, retail sales



*Week ended July 29.



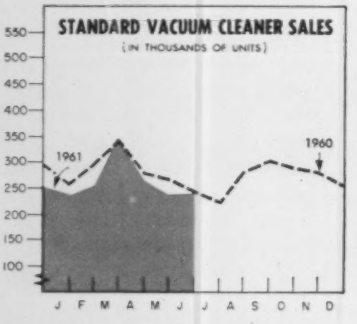


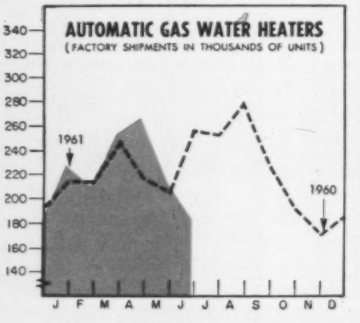
	Total		Building	
	1961	1960	1961	1960
Jan.	2,485	2,193	1,787	1,728
Feb.	2,235	2,240	1,674	1,685
Mar.	3,166	3,046	2,398	2,361
Apr.	3,297	3,360	2,504	2,527
May	3,501	3,337	2,658	2,563
June	3,602	3,472	2,779	2,593
July	....	3,597	....	2,481
Aug.	....	3,295	....	2,550
Sept.	....	3,119	....	2,402
Oct.	....	3,319	....	2,555
Nov.	....	2,886	....	2,169
Dec.	....	2,718	....	1,872
Totals	....	36,318*	....	27,345*

*Monthly figures do not add up to totals because of yearend revisions.
F. W. Dodge Corp.

	Washers		Dryers	
	1961	1960	1961	1960
Jan.	228,919	254,565	103,158	111,603
Feb.	227,562	283,640	81,310	108,367
Mar.	305,590	305,635	82,093	90,205
Apr.	209,695	235,828	46,042	53,213
May	247,904	243,943	42,672	53,700
June	304,295	276,955	60,705	64,950
July	.....	217,700	.....	72,600
Aug.	.....	296,500	.....	105,100
Sept.	.....	352,700	.....	165,500
Oct.	.....	305,800	.....	151,900
Nov.	.....	275,300	.....	142,000
Dec.	.....	223,500	.....	119,200
Totals	.....	3,272,066	.....	1,238,338

American Home Laundry Mfrs. Assn.





	1961	1960	1959
Jan.	242,515	258,330	242,516
Feb.	257,930	294,483	271,396
Mar.	349,972	339,918	346,557
Apr.	265,032	278,391	317,402
May	240,866	265,556	257,345
June	242,001	245,790	275,974
July	.....	223,008	221,232
Aug.	.....	280,575	268,165
Sept.	.....	301,935	305,096
Oct.	.....	290,059	330,899
Nov.	.....	280,550	290,130
Dec.	.....	254,631	293,818
Totals	.....	3,313,226	3,420,830

Vacuum Cleaners Mfrs. Assn.
Charts copyright, 1961, STEEL.

	Shipments—Units		
	1961	1960	1959
Jan.	229,300	215,500	266,200
Feb.	210,400	214,800	259,700
Mar.	255,000	247,300	265,900
Apr.	268,300*	216,200	261,300
May	215,600*	205,500	239,300
June	185,200*	256,000	250,000
July	.....	254,100	245,100
Aug.	.....	279,400	256,100
Sept.	.....	227,600	243,800
Oct.	.....	192,900	274,200
Nov.	.....	171,400	199,100
Dec.	.....	185,500	192,900
Totals	.....	2,666,200	2,953,600

*Preliminary.
Gas Appliance Mfrs. Assn.

have been lagging recently . . . sales by dealers of autos, furniture and appliances, building materials, and hardware are currently lower than they were a year ago . . . Sales of nondurable goods stores in 1960 and thus far in 1961 have not continued the growth shown in prior years; they have held within the narrow range of $12.3 billion and $12.6 billion on a seasonally adjusted basis over the last 12 months.

"Consumer expenditures for services have been rising steadily at a rate sufficient to maintain total consumer buying of goods and services fairly well in line with income changes," OBE concludes.

Stocks Climbing Slowly

About $6.5 billion of the $14.2 billion rise in the gross national product in the second quarter was accounted for by a reversal in the inventory trend. It went from a decumulation rate of $4 billion (annually) in the first quarter to an accumulation rate of $2.5 billion.

But it is difficult to pinpoint that change on an individual or industry-wide basis because businessmen still declare they are being conservative on stocks. STEEL's quarterly surveys of components and raw materials have consistently shown a lack of interest in rebuilding inventories. And the July survey of the National Association of Purchasing Agents reveals an "amazing resistance to inventory accumulation." Sixty per cent of the respondents reported stocks the same as they were in June, while 26 per cent reported lower levels.

Construction Contracts Up

Still one of the brightest spots in the economic picture is the construction industry. Housing starts and total construction activity have swung upward, and F. W. Dodge Corp. reports that contracts for future construction rose to $3.6 billion in June, up 4 per cent from the year-ago month. (See graph and table, at left.) Nonresidential and residential contracts accounted for the gain as heavy engineering fell behind the 1960 pace. For the year to date, nonresidential leads the corresponding 1960 total by 3 per cent; residential by 2 per cent; heavy engineering by 7 per cent. Total construction contracts so far this year lead the 1960 figure by 4 per cent.

However, it should be noted that the weekly construction contract statistics gathered by *Engineering News-Record* show the 1961 cumulative total lagging the year-ago figure by 2 per cent. But the two sources are not exactly comparable. *EN-R* is more concerned with heavy construction, such as public works, mass housing, and commercial and industrial buildings.

Not All Share Equally

One of the most noticeable characteristics of the recovery is the lack

of uniformity among industries. A recent sampling of the reports shows:

• *Used Machine Tools* — After reaching the year's low point in May, June showed up as the best month since January, says the Machinery Dealers National Association. Sales were 115 per cent of those in the 1957 base period.

• *Furniture* — Although June brought no relapse, declares the National Association of Furniture Manufacturers Inc., nothing appeared to encourage members. Orders and employment rose a mere 1 per cent while shipments and payrolls stood still. Compared with the first half of 1960, most aspects of the business are still between 10 and 15 per cent behind.

• *Industrial Furnaces* — For the second consecutive month, orders for industrial furnaces reached the $9 million mark, reports the Industrial Heating Equipment Association Inc. June orders (worth $9,194,000) were 117 per cent ahead of the June, 1960, level.

• *Water Heaters* — Following an encouraging spring buildup for the home construction industry, factory output of gas hot water heaters dropped significantly. June shipments were only 185,200 units compared with the year-ago total of 256,000, says the Gas Appliance Manufacturers Association. However, year-to-date total for 1961 is still 13,300 units ahead of the corresponding 1960 total.

• *Laundry Appliances* — However, June was a good month for the laundry appliance industry. (See graph and table, Page 52.) Total sales were up 25 per cent from May and 7 per cent from June, 1960, states the American Home Laundry Manufacturers' Association.

• *Cleaners*—Producers of vacuum cleaners did nearly as well in June as in the corresponding month of last year, reports the Vacuum Cleaner Manufacturers Association. (See graph and table, Page 52.) But for the year to date, 1961 still lags 1960 by 5 per cent.

• *Business Failures* — Data from Dun & Bradstreet Inc. do not reflect recovery.

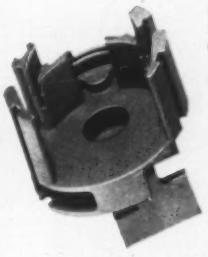
It reports the weekly average so far in 1961 is 342 failures compared with only 297 a year ago. Failures in the latest week (ended July 20) exceeded the average by one firm. (See Barometers of Business below.)

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)	1,790[1]	1,818	1,537
Electric Power Distributed (million kw-hr)	15,950[1]	15,829	15,157
Bituminous Coal Output (1000 tons)	7,790[1]	7,440	7,964
Crude Oil Production (daily avg—1000 bbl)	6,950[1]	6,948	6,821
Construction Volume (*ENR*—millions)	$399.7	$509.5	$365.5
Auto, Truck Output—U. S., Canada (*Ward's*)	100,873[1]	129,506	131,520
TRADE			
Freight Carloadings (1000 cars)	590[1]	584	614
Intercity Truck Tonnage (changes from year ago)	+0.8%	+0.6%	−1.2%
Business Failures (Dun & Bradstreet)	343	304	259
Currency in Circulation (millions)[2]	$32,476	$32,634	$32,041
Dept. Store Sales (changes from year ago)[2]	+2%	+3%	+3%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$28,580	$30,130	$26,123
Federal Gross Debt (billions)	$289.7	$289.2	$288.9
Bond Volume, NYSE (millions)	$36.1	$31.5	$22.7
Stocks Sales, NYSE (thousands of shares)	17,360	13,552	13,864
Loans & Investments (billions, adjusted)[3]	$112.9	$112.4	$106.6
U. S. Govt. Obligations Held (billions)[3]	$31.9	$31.5	$27.8
PRICES			
STEEL's Finished Steel Price Index[4]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[5]	225.1	224.4	233.2
All Commodities[6]	118.6	118.5	119.5
Commodities Other than Farm & Foods[6]	127.5	127.5	128.3

*Dates on request. [1]Preliminary. [2]Federal Reserve Board. [3]Member Banks, Federal Reserve System. [4]1935-39=100. [5]1936-39=100. [6]Bureau of Labor Statistics Index, 1947-49=100.

THE FREEDOM DiMENSION



. . . is shape flexibility

The investment casting process allows a new *freedom of design* . . . in shape . . . in materials. You can now design for function—the way you want the part!

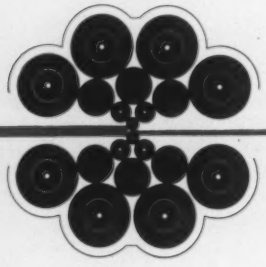
This functionally designed instrument chassis was poured as an investment casting without design compromise. Dozens of expensive and complicated machining operations would otherwise have been required. Check your design with Hitchiner—in many cases you can buy *just what you want.*

Write for complete technical and facilities information.

HITCHINER
Milford 1, New Hampshire

Report:

THIN GAUGE TINPLATE



How Sendzimir Mills help you compete in this growing market at an extra profit per ton

The growing market for thin tinplate below .008" thickness presents tinplate producers with both a problem and an opportunity.

The problem is not only to gain extra capacity for rolling these new gauges, but to achieve three other benefits:

a — reduce the normal production losses of lowering the finish gauges on present tandem equipment

b — eliminate the additional downtime of extra roll maintenance

c — provide the flexibility to take short runs

THE ECONOMICS

From a profit standpoint, thin gauge tonnage can be best achieved by combining present tandem facilities with a Sendzimir Mill. The tandem mill will roll approximately double the thickness required and supply coils to the Sendzimir Mill for single pass rolling to finished gauge. This provides an immediate tonnage gain from the tandem mill, since the finishing is on the separate Sendzimir Mill and eliminates the tonnage loss from lowering finish gauge on the tandem mill. Thus rolling time will be made available for the finishing of heavy gauge tinplate by the tandem mill.

SHORT-RUNS

Beyond the profit possibilities in producing thin gauge tinplate, the tandem and Sendzimir combination offer other production benefits.

You get the flexibility to make short runs with minimum interference to production on either coated tinplate, annealed or full hard black-plate. Actually, the Sendzimir Mill can make short runs of any low carbon steel rolled on the tandem mill and do it at a profit.

HOT MILL BENEFITS

Finishing lighter gauges on the tandem mill normally require lighter starting gauges. But with the Sendzimir Mill available, the hot rolled coils to be run at semifinished gauges can be substantially heavier, thus increasing production off the hot mill.

INSTALLATION AND OPERATING COSTS

The compact Z-Mill permits low foundation and installation costs. Less building area is needed. The small work rolls of the Z-Mill are replaced in seconds, reground faster on smaller grinders, handled easily. Downtime is reduced, operating efficiency is higher.

FINISHED PRODUCT

The Sendzimir Mill adds to your capacity a product quality unmatched by any other rolling system.

Strip flatness is maintained by adjustment of mill shape through the power crown control while the mill is operating. Strip edge pressure is controlled by lateral adjustment of the tapered intermediate rolls.

It is never necessary to compromise on surface quality because freshly ground work rolls are inserted so readily that consistently superior strip finish can be attained.

Because the smaller work rolls respond more readily to gauge adjustments, gauge is held more accurately and heavy ends can be brought into tolerance for an increase in yield.

PROOF

For a specific proposal of the way these benefits can be applied to your own mill operation, write or telephone Rolling Mill Machinery Sales. Phone Browning 2-3271, DDD Code 203.

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Acoustica president

H. Z. CARTER
Avondale Shipyards pres.

NICHOLAS DYKSTRA
Mack Trucks president

PHILIP C. SAYRES
Capewell Mfg. president

Rollin M. Russell was elected president of **Acoustica Associates Inc.**, Los Angeles. He joined the firm early this year as executive vice president. Previously, he served as executive vice president of Electronic Specialty Co., and as vice president and group executive for Hughes Aircraft Co.

H. Z. Carter, former executive vice president, succeeds **J. H. Bull** (retired) as president of **Avondale Shipyards Inc.**, New Orleans. **Sam P. Stone**, vice president, was elected executive vice president. **Edwin H. Fletcher**, chief engineer, was promoted to vice president-engineering.

A. A. Krueger was named vice president sales; **R. L. Smirl** vice president-engineering, **Borg & Beck Div.**, Chicago, Borg-Warner Corp.

John H. Kilmer Jr. was elected president and general manager, **Golden-Anderson Valve Specialty Co.**, Pittsburgh.

Nicholas Dykstra was named president and chief executive officer of **Mack Trucks Inc.**, Plainfield, N. J. He was vice president-finance of McDonnell Aircraft Corp., and previously served as executive vice president of Curtiss-Wright Corp.

Merle J. Davis was appointed sales manager, **Anchor Alloys Inc.**, Brooklyn, N. Y.

Maj. Gen. John A. Barclay, who retired in July as the Army's No. 2 missile chief, joined **Lionel Corp.**, Hillside, N. J., as vice president for research and development.

C. Paul Porterfield, former vice president, Method X Div., Firth Sterling Inc., was named director of sales for **Elox Corp. of Michigan**, Troy, Mich.

Carl E. Anderson was elected president and chief executive officer of **E. W. Bliss Co.**, Canton, Ohio. He was director of general management consultation for Ebasco Services Inc.

Philip C. Sayres was elected president of **Capewell Mfg. Co.**, Hartford, Conn., effective Oct. 1. At present, he is administrative vice president of Richardson-Merrell Inc., formerly Vick Chemical. **Staunton Williams** was elected chairman of Capewell, and chief executive officer.

Horace S. Daley was appointed manager, Numerical Control Dept., **Diehl Mfg. Co.**, Somerville, N. J. He was with Walter Kidde & Co. Other appointments to the department: **John J. Callahan**, sales engineer; **George Schmitt**, service engineer. **William T. Volkhardt** joins Diehl as market analyst.

Taylor Fibre Co., Norristown, Pa., named **Richard R. Hydeman** vice president-marketing and engineering. Former vice president-manufacturing, he is succeeded by **Frank P. Kelly**, who was manager of manufacturing at Brown Instrument Div., Minneapolis-Honeywell Regulator Co. **Dr. Fred P. Baughman**

JOHN H. KILMER JR.
Golden-Anderson pres.

C. PAUL PORTERFIELD
Elox sales director

CARL E. ANDERSON
E. W. Bliss president

RICHARD R. HYDEMAN
Taylor Fibre executive

L. P. McALLISTER

W. HARRISON LACKEY

Lukens Steel vice presidents

CARL McKELVY

JAMES E. WIDMAN

Royal McBee executives

succeeds **Dr. Carlisle M. Thacker** (resigned) as technical co-ordinator.

Lukens Steel Co., Coatesville, Pa., elected **L. P. McAllister** vice president-production; and **W. Harrison Lackey** vice president-sales.

Claude W. Mason was made vice president-assistant general manager; and **Frank J. Hoyne** vice president-sales, Mechanics Universal Joint Div., Rockford, Ill., **Borg-Warner Corp. James Peterson** was made assistant general sales manager.

J. Rodgers Hamilton fills the new post of manager of customer technical service for **United States Steel Corp.**'s central operations, Pittsburgh. He was manager of structural, plate, and high strength steel metallurgy.

Alexander H. Reynolds Jr., former treasurer, was elected a vice president of **Leeds & Northrup Co.**, Philadelphia, responsible for long range planning. **Stephen Loidl Jr.** was made treasurer and controller.

Lapointe Machine Tool Co., Hudson, Mass., elected **Joseph P. Crosby** vice president-director of sales. **James W. Dopp** was made vice president-sales. **Mike Fox** succeeds Mr. Dopp as sales manager of the subsidiary, **Lapointe Machine Co.**, also in Hudson. Mr. Crosby will direct sales policies of both companies.

Edward F. Rogers was named assistant superintendent, buttweld tube mill, in the Campbell, Ohio, Works of **Youngstown Sheet & Tube Co. H. James Smith** was made assistant superintendent-production at the Indiana Harbor, Ind., Works.

John S. Kratz was made product sales manager-metallurgical products, Chemical & Metallurgical Div., **Sylvania Electric Products Inc.**, Towanda, Pa., subsidiary of General Telephone & Electronics Corp. Mr. Kratz succeeds **Jerry D. Hix**, resigned.

Carl McKelvy was elected executive vice president, **Royal McBee Corp.**, Port Chester, N. Y. He was senior vice president responsible for production, and research and development. **James E. Widman** was elected vice president-production.

Kaiser Steel Corp., Oakland, Calif., named **Bernard E. Olsen** manager of Latin American sales for the company's first foreign sales office which opened in Buenos Aires, Argentina, Aug. 1.

Mine Safety Appliances Co., Pittsburgh, consolidated divisionalized research activities of the parent corporation and a research subsidiary. **Roger F. Mather** was made director of the newly established corporate Research & Engineering Div. which integrates personnel and facilities of MSA Research Corp., subsidiary. **Dr. W. P. Yant**, formerly in charge of Mine Safety's research activities, becomes research consultant to the president.

Leonard J. Linde was made director of engineering, Industries Group, **Allis-Chalmers Mfg. Co.**, Milwaukee. He was director of engineering services.

William A. Romain was elected president, **Novo Industrial Corp.**, Chicago, and will serve as chief operations and administrative officer. **Walter E. Bronston**, whom he succeeds as president, remains chairman and chief executive officer. Mr. Romain was president of Sherman Products Inc., Detroit.

William V. McRae Jr. was made Eastern regional manager, **Gerber Scientific Instrument Co.** His office is in Washington.

J. RODGERS HAMILTON

U. S. Steel services

ALEXANDER H. REYNOLDS JR.

Leeds & Northrup v. p.

JOHN S. KRATZ

Sylvania Electric div. sales

Gim H. Lee, former production manager of tungsten and molybdenum for Wah Chang Corp., was made vice president - operations, **Metallurgical International Inc.**, Wallington, N. J.

Misco Precision Casting Co., Whitehall, Mich., division of Howe Sound Co., appointed sales managers to head newly formed divisions. **Richard W. Arter** was made sales manager, Airfoil Products; **James H. Boyle**, Special Products; and **Rex Eberly**, Industrial Products.

Harry R. Meyer, assistant to vice president - administration, **Lukens Steel Co.**, Coatesville, Pa., was made purchasing agent.

Alonzo B. Kight was elected president of **Borg-Warner International Corp.**, subsidiary of Borg-Warner Corp., Chicago.

Harry L. Benjamin was promoted to vice president-marketing and engineering, **United Aircraft Products Inc.**, Dayton, Ohio. He was assistant to the president.

H. Eugene Crow Jr., former manager of industrial TV development at Dage Div., Thompson Ramo Wooldridge Inc., was named engineering manager of television systems for Kin Tel Div., **Cohu Electronics Inc.**, San Diego, Calif.

H. G. Solbach Jr. was made superintendent-grating manufacture; and **J. S. Murray Jr.** production engineer, Light Metals Dept., in the Engineering Works Div. of **Dravo Corp.**, Pittsburgh. **Charles M. Cooke** was named chief development engineer, air and gas separation, in the Machinery Div.

GIM H. LEE
Metallurgical Internat. v. p.

HARLEY F. GAUKER
Ajax Magnethermic div. post

W. F. SNELLING
North American exec. v. p.

At the Trenton, N. J., Div. of **Ajax Magnethermic Corp.**, **Harley F. Gauker**, former sales manager, Induction Melting Div., was made assistant division manager. **James R. Coley** was promoted from assistant sales manager to sales manager.

Carl A. Odening was named administrative assistant, office of the president, by National Carbon Co., New York, division of Union Carbide Corp. He was director of development.

Earl R. Dew was made sales manager, **L & J Press Corp.**, Elkhart, Ind.

Robert M. Keil was named magnesium mill products manager of **Dow Metal Products Co.**, Midland, Mich., division of Dow Chemical Co. He succeeds **John J. Clemens**, recently made manager of Dow's sales office in Atlanta.

J. B. Komendera was made sales manager, **Mechanical Air Controls Inc.**, Detroit. He was with Valvair Corp.

North American Aviation Inc., Los Angeles, appointed **W. C. Hobbs**, assistant to the senior vice president - administration, a vice president. **W. F. Snelling** was appointed executive vice president, and is succeeded as vice president-manufacturing by **Gary Stroh. William F. Parker**, chief engineer at the Space & Information Systems Div. at Downey, Calif., was named vice president, program management, of the division, heading its Saturn S-II booster proposal effort.

Frederick L. Lindsay was elected president of **Atlantic Stamping Co.**, Rochester, N. Y., to succeed the late **Leonard A. O'Connell. Martin J. Dowling Jr.**, former vice president, becomes chairman.

L. A. Kristoff joined **Alloys & Chemicals Corp.**, Cleveland, as executive assistant. In addition to executive duties, he will head the newly formed Special Products Div.

CHARLES M. COOKE
Dravo development eng.

ROBERT M. KEIL
Dow Metal Products post

J. B. KOMENDERA
Mechanical Air Controls sales

OBITUARIES...

E. P. Hagan, 53, vice president and controller, **Worthington Corp.**, Harrison, N. J., died July 25.

E. C. Erickson, 64, president, **Queen City Cutler Works**, Titusville, Pa., died July 20.

Frank J. Karg, 64, founder and president, **Karg Machine Products Inc.**, Akron, died July 19.

William E. Daley, vice presient, **Sweet's Steel Co.**, Williamsport, Pa., died July 26.

ACME STEEL MACHINES STRAP CIRCLES AROUND ANY OTHER METHOD

In the slit coil field alone, dozens of producers are proving that Acme Steel automatic strapping systems are the most productive partner slitting equipment ever had. For instance, the new F4 Strapping Machine and Indexing Table (at left) let one man completely strap as many as 150 coils *of any width* per hour—all through push-button control. And once secured, coils are unitized just as efficiently with Acme Steel portable powered strapping tools.

Thanks to this rapid, non-stop flow, existing slitting equipment can run *continuously* at full capacity, eliminating the need for investing in additional slitting lines in many instances. No wonder Acme Steel automatic strapping equipment can pay off in 18 months!

No field has a monopoly on these savings. Acme Steel equipment is scoring unparalleled productivity gains in strapping giant hot coils, paper, textiles, products and packages of every description . . . in bundling and unitizing such products as lumber, building materials, bar stock, pipe and sheet metals.

Full facts on industry's most proven and productive strapping systems are as close as your phone. Call your Acme Idea Man for an evaluation of your particular operation. Or, clip the coupon for case studies.

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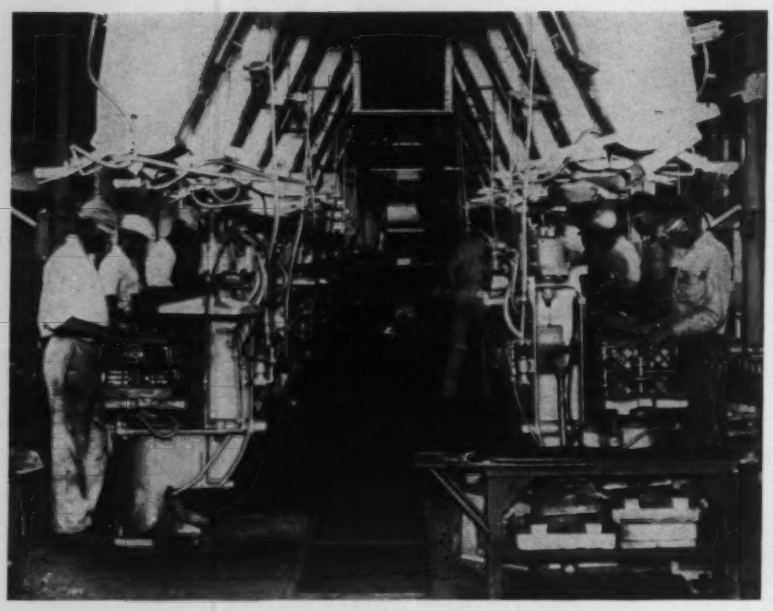


Jolt-squeeze molding stations activated as . . .

International Harvester Opens Nodular Iron Foundry

GROWING IMPORTANCE of nodular iron as an engineering material is demonstrated by the conversion of International Harvester Co.'s gray iron foundry in Memphis, Tenn., to the exclusive production of the newest of the castable irons.

"We have converted a fine gray iron foundry into an even finer nodular iron foundry," says Brooks McCormick, executive vice president. The foundry will produce castings for all International Harvester plants in the three major divisions (Farm Equipment, Motor Truck, and Construction Equipment) and eventually will produce nodular castings for other firms as well.

"We use nodular iron mainly as a substitute for cast or forged steel parts because it costs less, weighs less, and can meet the strength requirements of low carbon and most medium carbon steels," says Mark V. Keeler, vice president, Farm Equipment Div.

• **Output Soars**—International Harvester poured 510,000 lb of nodular iron castings in 1953 and jumped the annual output to more than 19 million lb in 1960. Capacity of the new Memphis foundry is sufficient to give the firm an increase of 36 per cent in production and can be about doubled by the addition of more heat treating facilities.

While the capacity of the foundry is 8500 sand molds and 135 tons of nodular iron per shift, present daily rate of production is 75 tons of iron, melted in the smaller of two cupolas externally cooled by water.

The gray iron castings formerly produced at Memphis were transferred to other International Harvester gray iron foundries.

"Controlled and automatic" best describe the Memphis nodular foundry, says Mr. Keeler. "Automatic controls are built into the mixing of the sand and its delivery to the molding stations, the temperature and moisture content of the hot air blasted into the cupolas, the treatment of base iron by submerged alloys, the cooling time of castings, and the heating and air quenching during normalizing and annealing process," he adds.

The foundry will produce three grades of nodular iron castings, ranging in tensile strength from 65,000 to 100,000 psi and in yield strength from 45,000 to 70,000 psi. Ductility will range up to 25 per cent.

Computer Lab Planned

Computer Dept., Phoenix, Ariz., General Electric Co., is constructing a $1.5 million, 39,000 sq ft computer laboratory at Sunnyvale, Calif. Dr. C. F. Spitzer is manager of the laboratory.

Joins Indian Undertaking

McNally Pittsburg Mfg. Corp., Pittsburg, Kans., has joined with Bird & Co. (Pvt.) Ltd., Calcutta, India, in the formation of McNally-Bird Engineering Co. (Pvt.) Ltd., Kumardhubi, Bihar, India. The Indian company will produce material handling and processing equipment, crushers, screens, speed reducers, belt conveyors, dryers, calcining equipment, coal washing equipment, car handling equipment, and fabricated plate parts. It will also operate as contractors for complete plants based on U. S. design and will supply a wide range of maintenance service to the heavy industries in the Kumardhubi area. Lyle W. Stewart is the acting managing director.

Offers Prepainted Metals

Eastern Products Corp., Baltimore, has established a Metal Finishing Div. to sell prepainted coiled steel and aluminum in a wide variety of gages and widths. Facilities are also available for zinc and phosphate coating and for brass plating. Arthur W. Arendt is sales manager of the division.

Texas Gas Plant Planned

National Cylinder Gas Div., Chemetron Corp., Chicago, will build a $1 million air separation plant on a site adjacent to that of Texas Instruments Inc., Dallas. The plant will have a daily capacity to produce 120 tons of oxygen, nitrogen, and argon in liquid and gaseous forms. Machinery for the plant is being supplied by American Air Liquids Inc., New York.

Crucible Installs Units To Test Space Age Metals

Crucible Steel Co. of America, Pittsburgh, has installed two, vacuum, tensile test furnaces at its Central Research Laboratory to determine strengths of Space Age metals under conditions designed to simulate those hundreds of miles above the earth. The furnaces are a development of High Vacuum Equipment Corp., Hingham, Mass., and are designed for rapidly bringing the sample to desired conditions of vacuum and temperature. Crucible Steel's metal evaluation studies to date involve creep and tensile testing of refractory metals at 3000° F as well as heat treatment at temperatures up to 3500° F at a vacuum from 1×10^{-4} to 1×10^{-5} mm Hg.

Milburn Erecting Plant

Alexander Milburn Inc., Baltimore, will erect a plant in Anne Arundel County, Maryland, containing 19,000 sq ft of manufacturing space and 5000 sq ft of office space. The firm makes welding equipment and electronic control systems.

Schwing Opens U. S. Branch

Schwing-American Corp. has been established at 614 Shaw St., Rockford, Ill., as a branch of Friedrich Wilh. Schwing Co., West German manufacturer of construction equipment. A second and related enterprise, AirWay Concrete Placement Corp., is being set up at the Rockford address. E. A. Hoyum is president of the two firms. Plans call for almost all parts of Schwing equipment to be manufactured in the U. S. within a short time. AirWay Concrete will operate the hydraulic and pneumatic concrete pumping equipment for contractors and engineers on a job basis.

Nooter Boosts Capacity

Nooter Corp., St. Louis, is increasing its shop area and installing heavy duty equipment that will enable the firm to produce pressure vessels weighing up to 250 tons, or twice as heavy as its largest units at present. The $1 million project is slated for completion in 1962. New equipment will include a heavy duty bending roll (capable of cold rolling 3⅝ in. thick plates, or hot rolling 6 in. plates) and a series of heavy industrial cranes. Plant area will be increased 50,000 sq ft.

Acadia Plans to Rebuild

Acadia Mfg. Corp. will erect a 20,000 sq ft plant at White Marsh, Md. The company makes aluminum doors and windows and plans to broaden its line by installation of equipment for fabrication of aluminum siding and awnings. Louis J. Barry is president.

Olin Enlarges Omal Plant

Olin has launched a multimillion dollar expansion program at its Omal, Ohio, aluminum rolling mill. New facilities will include a 66 in. cold rolling mill for producing bright finished sheets. Another mill stand will be added to the present hot strip mill, along with more ingot heating facilities and a new automatic flying shear for cutting plates to length, and auxiliary plate sawing, flattening, and inspection equipment. Some of the facilities will be in operation early next year and all are scheduled to be completed by the end of 1962. The new bright mill and auxiliary equipment will be housed in a 36,000 sq ft building.

Rust to Build Furnaces

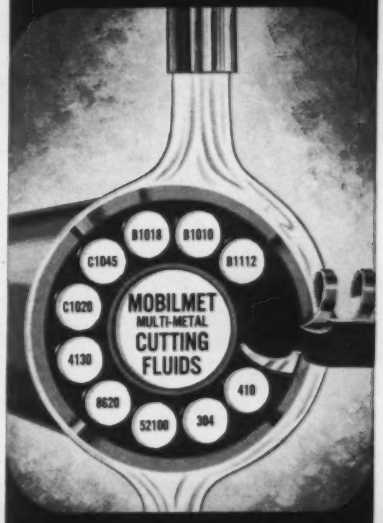
Rust Furnace Co., Pittsburgh, will construct four furnaces for Reynolds Metals Co., Richmond, Va., which will provide a 30 per cent increase in the capacity of the casthouse at the alloy plant in Sheffield, Ala. The furnaces are part of a $2.5 million expansion program. (STEEL, May 29, p. 66.)

Forms British Affiliate

Vulcan-Hart Corp., Baltimore, manufacturer of commercial ranges and kitchen equipment and utensils, has joined in a venture with Brightside Engineering & Foundry Co. Ltd., Sheffield, England, to erect a 100,000 sq ft plant at Sheffield for the production of Vulcan-Hart products. The new unit,

(*Please turn to Page* 64)

SEE AD ON FOLLOWING PAGES...



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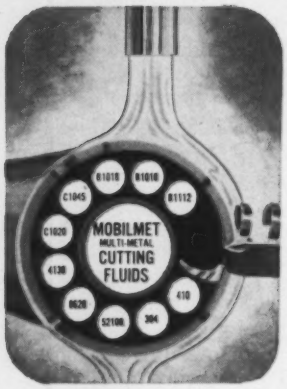

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Due to a unique additive combination, a single Mobilmet oil can be used on both soft, draggy metals and hard, brittle workpieces. As a result, there's less downtime for tool and cutting-oil changes. You get more production from each machine. And you save on handling costs, since you stock fewer oils. The wide range of Mobilmet applications includes: turning, drilling, boring, milling, gear hobbing, shaping and shaving, threading, tapping, pipe threading, surface and internal broaching, thread and form grinding, thread rolling, forming and special automatic screw machine operations.

Superior machining efficiency

In developing Mobilmet cutting fluids, Mobil research engineers made use of this Tapping Efficiency Tester to evaluate Mobilmet machining efficiency. In these tests and in field service on soft, draggy SAE1020 steel, new Mobilmet fluids out-performed cutting fluids designed specifically for this service.

Versatile new cutting oils offer you greater machine output, longer tool life, reduced loss from rejects, exceptionally wide range of applications! Now, after two years of exhaustive research and field testing . . . new Mobilmet* oils—the first multi-metal cutting fluids ever offered to the metalworking industry.

Mobilmet oils are uniquely versatile . . . help simplify your cutting oil requirements because each grade is effective over ranges of metals and operations beyond the capacity of any conventional product. And Mobilmet oils offer you superior machining results as well—in terms of improved finishes, longer tool life, and reduced staining.

Behind this versatility and effectiveness: a new additive combination, developed and patented by Mobil, which is pressure-temperature selective in its activity and—highly effective over wide ranges of cutting pressures and temperatures. For complete information, call your Mobil Representative or use coupon on preceding page.

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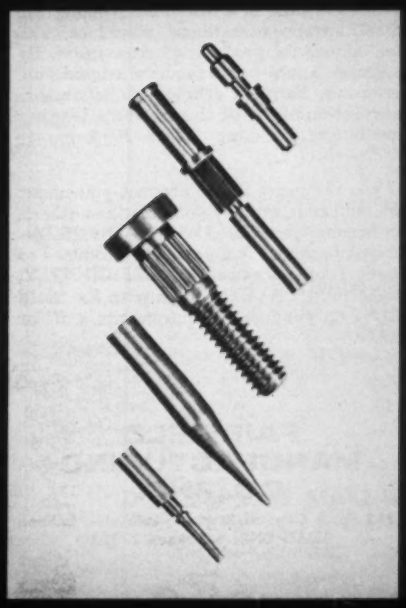
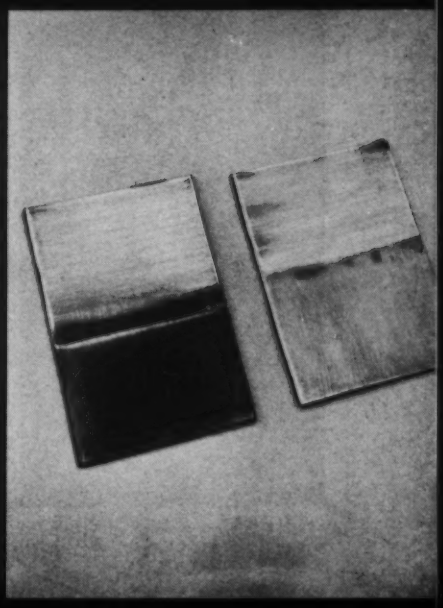
Longer tool life

Protected by heavy-duty Mobilmet, these pipe threading chasers, used for six weeks in moderately severe job-shop service, show little wear on either tool faces or thread crests. Mobilmet oils can mean longer tool life on soft or hard metals.



Fewer rejects

Because Mobilmet oils effectively control built-up edge and tool wear, you get superior finishes—fewer rejects. In some cases, Mobilmet oils reduce the need for additional finishing operations.



Less stain

New additive combination in Mobilmet oils inhibits staining effect. Plate on left was immersed in conventional corrosive cutting oil; plate on right was immersed in heavy-duty Mobilmet suitable for same application. Repolished tops of plates show original condition.

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(*Concluded from Page* 61)

Moorehead-Vulcan Ltd., will distribute the products through the United Kingdom and Africa. Vulcan-Hart also is installing equipment in a 36,000 sq ft addition to its plant in Baltimore.

Armco Gets More Oxygen

Linde Co., a division of Union Carbide Corp., New York, has placed in operation the second oxygen plant at the Middletown Works of Armco Steel Corp. The plant has a daily capacity of 140 tons and boosts Armco's daily supply to 270 tons. The bulk of the oxygen is used in the firm's open hearth furnaces and the balance for such operations as welding, heating, cutting, and scarfing.

CONSOLIDATIONS

Chicago Steel & Wire Co., Chicago, purchased **All West Wire Products Co.**, San Carlos, Calif., and **Advance Mfg. Co. Inc.**, Carlstadt, N. J., and will operate the properties as wholly owned subsidiaries. The parent firm is transferring its executive offices to Columbus, Ohio. Chicago Steel and San Carlos firms make fine steel wire; Advance, aluminum wire.

Robertshaw-Fulton Controls Co., Richmond, Va., has officially acquired the assets of **Lux Clock Mfg. Co. Inc.**, Waterbury, Conn., and will operate the property as Lux Time Div. Arthur E. B. Tanner is managing director of the division; Paul A. Lux, general manager.

Three scrapyards in LaPorte County, Indiana, have merged: **Indiana Salvage Co., Waste Material Corp.**, and **Maple City Steel Supply Co.** Main operating yards of the consolidated firm, American Metals Inc., are on U. S. Route 12, Michigan City, Ind. Officers are: President, Henry Winski; executive vice presidents, Irv Lansing and Nate Winski; vice president-operations, Martin Miller; vice president-Nonferrous Div., Ed Winski; vice president-Foundry Div., Joe Morgan; and secretary-treasurer, Babs Lansing.

STEEL

Technical Outlook

JEWELS IN THE SKY—Sapphire windows will protect solar cells from space radiation and permit proposed communication satellites to function for ten years or more. Thousands of solar cells, which convert sunlight into electricity, will power the satellites. They will recharge a battery which serves as a continuous source of power. Platinum sidebars will be brazed to the synthetic sapphire windows, and the platinum will be soldered to a ceramic base. All three materials expand at nearly the same rate, avoiding damage from thermal expansion. The solar cells themselves will be more costly than the sapphire windows, says Bell Laboratories.

CONCRETE GLUE—The Port of Los Angeles eliminated downtime for major pier repairs with an epoxy glue. Liquid resin fills the cracks, then sets up to seal and bond the concrete. In test bars, failure took place through the concrete, not through the resin joint, members of the American Society for Testing Materials were told.

SPACE FUEL FOR SALE—Cesium, a metallic element that may help propel ion engine vehicles through outer space, is being marketed at a purity of 99.9 per cent by Dow Chemical Co., Midland, Mich. Price: $375 a pound in quantities of 1 to 4 lb, $325 a pound for 5 to 9 lb. Dow also sees a large potential market in thermionic converters using cesium plasma.

SATELLITE POWER—Sealed silver - cadmium cells, undergoing evaluation as replacements for nickel-cadmium batteries in solar cell accessory power systems, may give weight savings in satellites. The batteries, developed by Yardney Electric Corp., New York, are being tested by Boeing Co., Seattle. The new batteries are said to have high charge rates at high current efficiencies and deep discharges, even for short cycle applications.

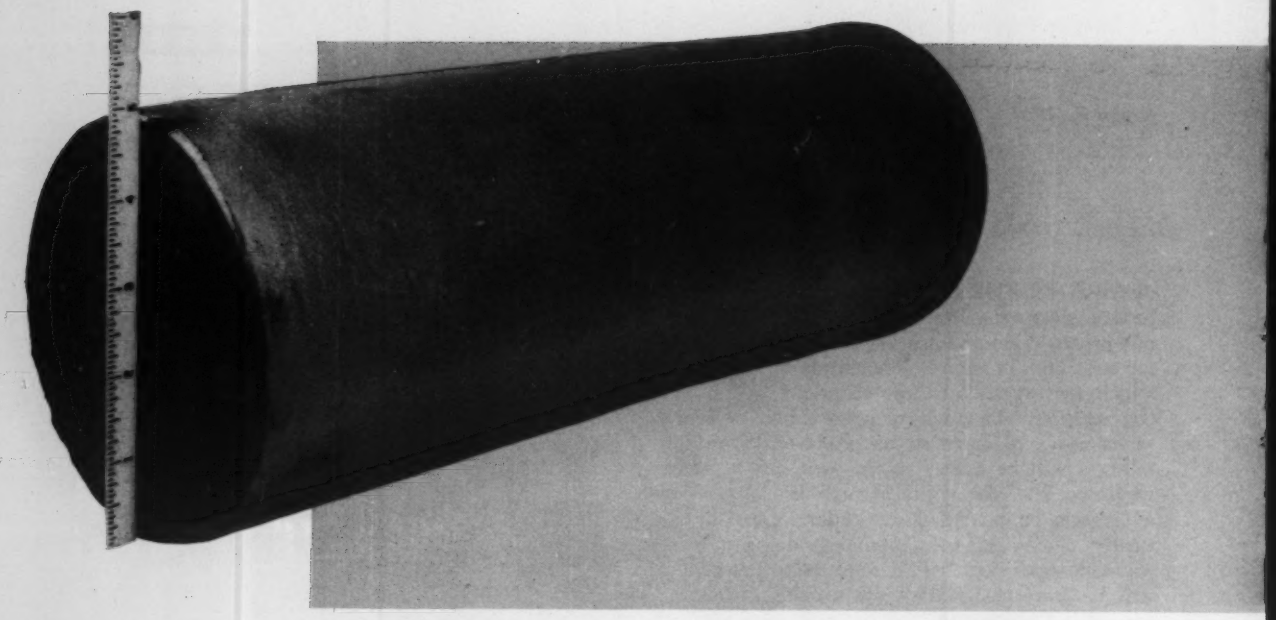
SUPERSONIC TRANSPORT PROBLEMS—William M. Allen, president, Boeing Co., Seattle, cites two technological problems to be solved before supersonic transports are feasible: 1. New types of fuel cells and other nonmetallic items of aircraft equipment will have to be developed to withstand the heat of speeds above Mach 2. 2. The seemingly ever present sonic boom that a supersonic plane pushes ahead of itself across the countryside must be eliminated or modified to permit travel over populated areas.

HYDROGEN PILLS—In industrial and laboratory jobs, where a portable source of hydrogen is needed, a tableted mixture of sodium borohydride and cobalt chloride may be the answer. The tablets react catalytically with water to produce hydrogen. Metal Hydrides Inc., Beverly, Mass., makes them, calls them Hydripills.

COMPUTER TRENDS—Researchers at Westinghouse Electric Corp., Pittsburgh, have revealed: 1. Computer control of electric power generating stations will spark a trend to lighter, smaller generating turbines, since utilization will be more efficient. 2. In 15 years, computers have lowered the cost of making a mathematical calculation by a ratio of 30,000 to 1.

CERAMIC GAGES TO BOOM—Gage elements and wear surfaces are expected to be good markets for ceramics, says M. E. Day, manager, Stupalox Project, Carborundum Co., Niagara Falls, N. Y. Much of the publicity has been given to the use of ceramics for cutting tools, but gage elements aren't to be ignored. Several gagemakers, like Pratt & Whitney Co. Inc. and Greenfield Tap & Die Co. are already out with ceramic fixed gages.

COMPUTER MAKE-BELIEVE—One of the roles for computers is that of simulating complex industrial processes. The computers are set up to simulate equipment or a whole process. Control systems engineers then hook up control equipment to the computers to test it for performance and, in some cases, to debug the proposed control system before it's installed. Westinghouse Electric Corp. uses an analog computer to do the simulating. Bell Telephone Laboratories uses a digital computer for similar purposes.



In handling large pressings, good green strength reduces damage

Higher pressing pressures may not be needed....

Particle Control Beefs Up Compacts

ARNOLD R. POSTER
Chemical & Metallurgical Div.
Towanda, Pa.
Sylvania Electric Products Inc.
Subsidiary of General Telephone & Electronics Corp.

• YOU CAN CONTROL the strength of pressed compacts of powdered metals by controlling particle size, size distribution, and particle shape as well as compacting pressure. Green strength determines your ability to handle the parts before sintering. It becomes particularly important as the size and complexity of powder parts increase and tougher metals are used.

Strength and density are not necessarily equivalent, especially with metals like tungsten. Such brittle materials do not form point welds under pressure as well as more ductile metals. Important variables for tungsten are the interlocking of irregular particles and "interfit"—the ability of finer particles to fill voids between larger ones.

The difficulty of working with tungsten was overcome by special handling methods when the metal was used principally for wire and reduced by swaging. Handling green compacts in volume by mechanical devices increases the danger of damage and calls for a greater understanding of compacting mechanisms.

• The pressing of metal powders requires several stages.

In a section on pressing in *The Physics of Powder Metallurgy*, R. P. Seelig says they occur in this order:

• Bridges formed in mold filling are broken down as initial adhesive forces are overcome; there is considerable movement; and small particles are squeezed into voids. Little deformation of the particles occurs.

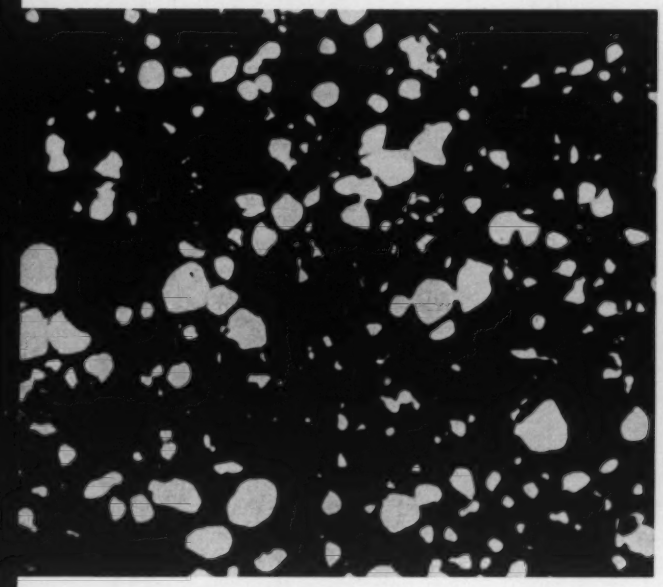
• Deformation starts, and aggregates of particles are formed. Most of the possible movement has occurred, and absorbed energy is used for deformation or taken up by frictional losses.

• Continued pressure overcomes elastic and residual stresses. Contact areas grow; surface irregularities are abraded; oxide and gas films are penetrated. Mechanical interlocking also takes place.

Relationships among those processes depend on the ductility of the particles and their physical nature —size, shape, and size distribution.

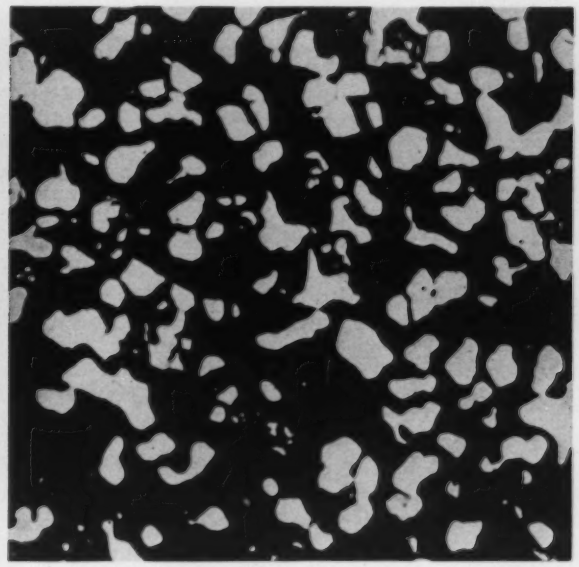
• Manufacturing methods for the powders determine their pressing characteristics.

The shape of the powder is controlled by its production process. Powders made by the reduction of an oxide are usually porous, equiaxed, and angular; vapor deposited



X 2000

Usual shape of hydrogen reduced tungsten



X 2000

Irregular particles alter properties (see below)

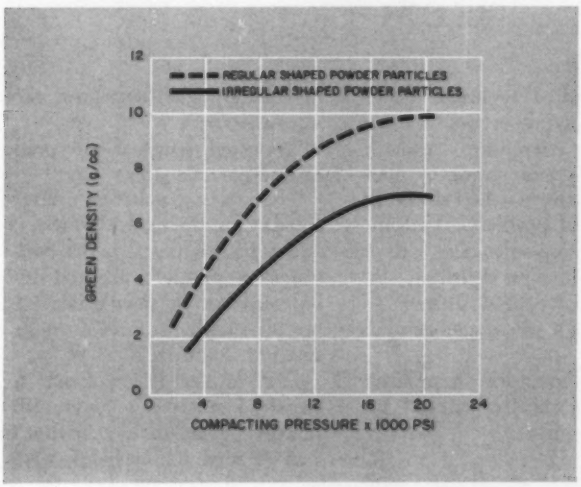
powders are normally spherical; electrolysis produces dendritic type particles.

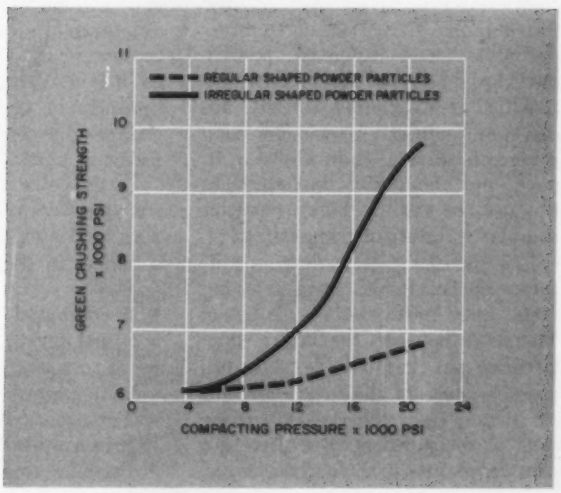
The ductility of the particles is determined by the manufacturing method and by the presence of impurities. Fine powders made by mechanical grinding of coarser particles have been work hardened and are usually annealed before compacting. Atomized and electrolytically produced powders are heated in a reducing atmosphere; this anneals them at the same time it reduces residual oxides.

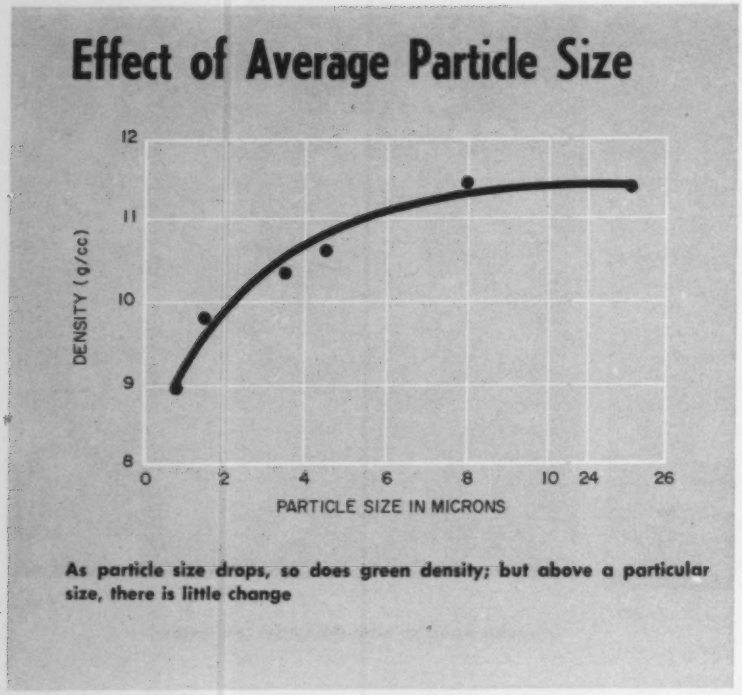
• Interparticle bonding is effected by the material and by the compacting conditions.

The purpose of the compacting step is to produce adequate strength and density. Strength determines the ability of the compact to withstand handling prior to sintering; density may determine the physical and mechanical properties of the sintered compact.

Under the compacting pressure, atoms in adjacent particles are pushed toward each other, and their force fields overlap. The bonding between particles largely depends on the extent of this effect; with ductile metals, it may be extensive; while for hard particles, contact areas are smaller, and interatomic







As particle size drops, so does green density; but above a particular size, there is little change

bonding is limited to areas where abrasion or fracture occurs.

Interparticle bonding, though important in green strength, does not always govern the sintering characteristics of powders. Uncompacted—or loose—powders have been sintered to high densities; slip cast powders have been sintered to densities as high as 98 per cent of theoretical.

Particles of irregular shape may interlock mechanically without interatomic bonding.

• Particle shape affects flow and compactability; so do size and size distribution.

Angular and equiaxed powder particles offer the best chance for making green compacts that are dense and strong. If particles have a smooth surface, they are easy to pack into the cavity, but they do not deform easily. Flaky particles are also inferior for compacting.

Low density may result from uniform particle size; with varying sizes, finer particles flow into the interstices between the larger. Fine particles can cause low density compacts because of the larger amount of friction from the greater surface area of the powder. But there are also more interparticle contacts, so that sintering will progress rapidly.

• Tungsten powders are produced in fine particle sizes.

The starting point is a finely divided tungstic oxide, which is reduced by hydrogen or carbon. So tungsten powders are too fine to be measured by sieve analysis; they are all smaller than 400 mesh, the smallest commercial sieve.

Particle size is expressed in microns (1 micron is about 39 millionths of an inch); if the tungsten is used for carbides, filaments or welding electrodes, the size range is 1 to 6 microns—in this range, a difference of 1 micron is a large percentage of the total. Differences of as little as ½ micron will influence hardness of cemented carbides, or change the workability of swaged tungsten bars.

Particle size distribution of tungsten powders characteristically narrow, and the particles tend to be spherical in shape.

• A combination of several factors accounts for the poor compactability of tungsten powders.

Four reasons are given:

- Tungsten powders are inherently brittle, so initial bonding is poor.
- Particles are rounded, rather than irregular; there is little chance for interlocking to contribute to green strength.
- Particle size is fine, causing high friction during pressing.
- The size range distribution is narrow, so there is little possibility of increased density or strength from filling interstices.

• Use of irregularly shaped tungsten particles will help in building green strength of compacts.

Although particle shape is important in the pressing of any type of metal powder, it is particularly so for tungsten, which is not ductile. In general, irregular particle shape can be expected to result in stronger compacts than smooth or flaked types. For ductile particles, such as iron or copper, they provide a greater surface area for cold welding; this in turn determines the green density and strength and the results after sintering. Mechanical interlocking, in the case of ductile powders, is of minor importance. For brittle powders, like tungsten, welding is of lesser moment and the interlocking becomes a governing factor.

The photomicrographs show examples of tungsten powders—they were produced by hydrogen reduction of tungstic oxide, and they have about the same particle size. One is irregular in shape; the irregularity includes all sizes of particles within the range, although some rounded particles are also apparent. (See Page 67.)

• Comparison of the test results shows the effect of irregular particles.

When samples of the two powders used (unlubricated) were compacted in a single pressing in a 1.0 in. diameter die, the results of irregularities became apparent. (Standard samples, 60 grams, were used.) Density was determined by comparing the weight in air to the measured volume; crushing strength was determined by slow crushing of the compacts.

Compact strength values are greater for the irregular particles over the entire range of pressures. While the difference is small at low pressures, it increases as the compacting pressure becomes greater. It seems that the difference is due to a greater amount of interlocking of

the more irregular particles. Higher pressures cause greater interlocking, both in number of particles and in degree of interlocking.

The increased green strength is obtained with the sacrifice of some green density, as compared with the more regular powder. Probably the irregular particles develop more friction during pressing, so that more pressure would be needed to develop the same density. And increased pressure means greater friction, so the difference becomes greater at high pressures.

The strength and density of both of the materials increase as compacting pressure is increased. There is a tendency for the change to be less above 16,000 psi.

In the case of irregularly shaped particles, unlike the rounded, the strength continues to increase with increasing pressures although the density does not change markedly. The increasing strength at nearly constant density is hard to explain by an interlocking mechanism. It is possible that localized heating takes place within the bulk of the compact because of greater friction. Then localized plastic deformation with an increase in strength but without a reduction of porosity becomes possible.

When comparing hydrogen reduced, rounded particles with particles made by fused salt electrolysis, but otherwise of the same particle size, somewhat similar effects were observed. (The Reno Metallurgical Research Center of the U. S. Bureau of Mines made the particles by electrolysis.) When equal weights of the two materials were compacted under equal pressures, the densities were the same, measured at 11.5 grams per cu cm. Crushing strengths were markedly different. For the fused salt powder, crushing strength was 2500 psi, while the hydrogen reduced material was only 500 psi.

• Distribution of particle sizes affects green strength and density.

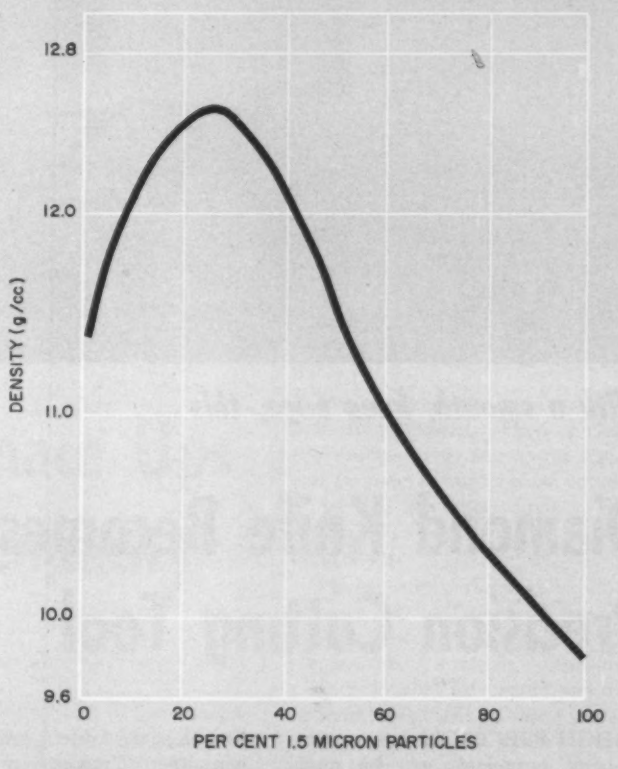
The more brittle the material, the more important is the proper control of size distribution, but it has been shown that for molybdenum (less brittle than tungsten), the highest green density for pressure compacted powders was obtained by the use of a mixture of 20 to 30 per cent of a 2 micron powder with the balance a 10 micron powder. For slip casting molybdenum, without pressure, the highest green density is obtained with the finest powders, which also produce the highest sintered density.

With tungsten, higher green densities are produced by the use of coarser powders, up to about 8 microns. Over this value, the increase is negligible. Particle size distributions are also important, and the correlation between the various methods of measuring particle size is limited in the sub-sieve ranges. In the powders used, the range of sizes increased with increasing average particle size. One way to consider the size range factor is in terms of the spread of maximum to minimum sizes.

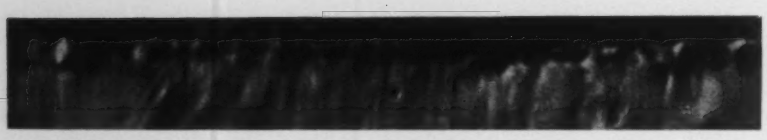
If the packing of the particles is a factor, an addition of fine particles to a coarser powder should cause an increase in the green density of the compact. Using mixtures of 25 and 1.5 micron powders, it is seen that this is the case up to a critical ratio, after which density again decreases as the effect of the finer powder becomes predominant. Coarse particles alone have a low green density because of voids which can be filled by finer particles. As more of the finer particles are added, they eventually form the continuous component of the mixture, and the effect of surface friction of the finer particles becomes predominant.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

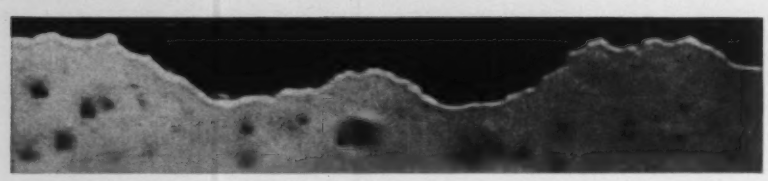
Effect of Particle Distribution



Blending relatively coarse and fine particles shows there is a mixture with optimum green strength

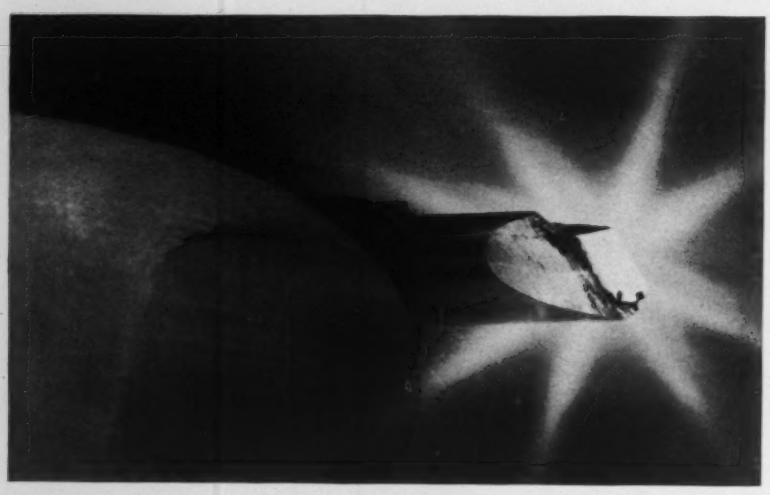


RAZOR BLADE EDGE



COMMERCIALLY SHARPENED DIAMOND

DIAMOND KNIFE



With a smooth, keen edge, this . . .

Diamond Knife Becomes Precision Cutting Tool

• HIGH PRECISION cuts on metals and nonmetals can be made with a diamond knife; it's so finely ground that the radius is equivalent to 12 carbon atoms.

Produced in the Mechanical Research Laboratory of E. I. du Pont de Nemours & Co. Inc., Wilmington, Del., the knife is being used for a number of research projects, says Du Pont's Earl Sugg.

Du Pont's varied interests include closer tolerance machining for both production and laboratory equipment used to make precision products.

• Stones for the knives are selected from flawfree, gem quality diamonds that are properly oriented for the subsequent steps.

Cleavage (rough forming by splitting) and grinding follow unconventional procedures; final polishing must be ultraprecise.

The diamond knife is supported in a metal holder which may be stainless steel, tool steel, or carbide. Soft solder or silver solder holds the stone in place. An evaporated metallic coating on the diamond permits metal to metal joining.

• Largest knife made by Du Pont so far is 9/32 in.

One other company in the U. S. and two overseas make similar devices, but 1/16 in. heretofore has been considered big. The knife was first developed in Caracas, Venezuela, by Dr. H. Fernandez-Moran, who wanted to make better biological specimens.

Length limitations in producing the knives are not yet known. They may be controlled only by the size of diamonds available.

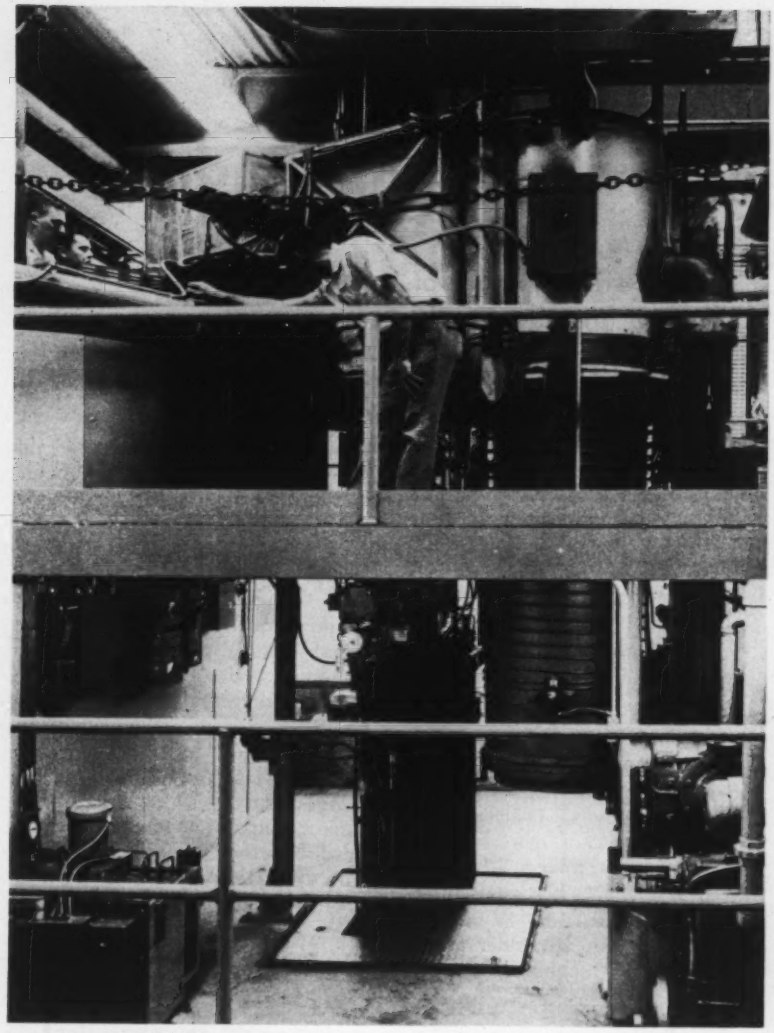
• To obtain the precision the knife permits, special cutting tools are required.

For one thing, the knife must be properly held to avoid vibration. Knives fail from abuse rather than from wear, says Mr. Sugg.

The knife is set up under a microscope. Cuts should be less than 50 millionths of an inch. If the machine is rugged enough, and precise enough, no lapping is necessary. Metal cutting operations so far tried have been planing; turning will be next.

With a cutting edge 0.1 millionth of an inch, and an adequate cutting machine (like a microtome, used in preparing tissue samples) an undistorted, highly polished surface remains. Tests have shown that the surface can be used for metallographic examination, without polishing. Pure metals as soft as lead or tin, bismuth, indium, silver, copper, aluminum, cadmium, zinc, brass, mild steel, and stainless steel have been cut for metallographic samples. Hardness of the stainless steels has ranged from Rockwell C 45 to C 62.

Knives can be resharpened a number of times at one-fourth to one-third the cost of a new one.



Ingots of pure columbium and tantalum, up to 8 in. OD and 42 in. long, are melted in this 300 kw, electron beam furnace, one of the country's largest

Electron Beam Furnace Ups Refractory Metal Capacity

• HAYNES STELLITE CO., Kokomo, Ind., a division of Union Carbide Corp., is counting on a new, 300 kw, electron beam furnace and a recently developed columbium alloy (CB-752) to make it a major contender in the refractory metal market.

Haynes is no stranger to the refractory metal field. For several years, it has been supplying tantalum products and hot pressed tungsten shapes. Now, says the company, wrought forms of columbium and vanadium are available as production items in rods, bars, wire, sheets, strip, and plates.

• Haynes executives are hopeful the new alloy will pin down the markets for columbium that have so far been elusive.

Claims Haynes: "The alloy can be fabricated by conventional methods including welding, and has an ultimate strength over 25,000 psi at 2400° F. The ability to fabricate the alloy and to form a ductile weld joint with it eliminates one of the major stumbling blocks in the application of high strength columbium-base alloys." Haynes also claims the alloy is not embrittled on heating as much as other columbium alloys.

CB-752 contains 89 per cent columbium, 10 per cent tungsten, and 1 per cent zirconium.

• With installation of the new furnace, Haynes joins the handful of U. S. firms using the technique to produce refractory metals.

Proponents feel the electron beam furnace produces the highest purity and most easily fabricated material because an electron is noncontaminating and because the melting takes place in a high vacuum.

Other specialized equipment at Haynes includes a consumable electrode, vacuum arc furnace; vacuum annealing facilities; and a welding dry box. Such conventional equipment as a 2000 ton forge press, standard sheet, plate, and bar mills, a Sendzimir cold finishing mill, and wire drawing equipment are also used to produce the wrought refractory shapes.

With conventional equipment, the company says it can cold roll columbium and tantalum down to 12 mils thick, up to 48 in. wide, and up to 120 in. long.

• Hot pressed tungsten is being actively promoted. Haynes claims the process gives fine grain size. It can be used to make parts equal to a 14 in. diameter circle. Parts weighing as much as 250 lb have been made.

Market applications are still being sought. Tungsten has numerous space and civilian high temperature potentials. Tantalum looks promising for missile and high temperature furnace uses, but its major market will probably continue to be in electronics. Vanadium may find a market in nuclear energy components, superconductors, and turbine blades, and in less glamorous uses such as chemical processing gear, electronic components, and fasteners.

Harder Sell Needed for Export Business

U. S. machine tool builders can capture a major share of a five year, $100 million market in Finland, says Minneapolis builder on return from that country

• **TO SELL capital equipment abroad, U. S. builders will have to treat overseas buyers more like customers, less like foreigners.**

So contends William H. Drisko, president, Stone Co., Minneapolis. He has just returned from six weeks as a member of the Department of Commerce's U. S. Trade Mission to Finland. As proof of his contention, Mr. Stone says he sold more than $500,000 worth of machine tools while he was in Finland, including two numerically controlled machines.

"Too often, U. S. builders don't even act anxious to take orders from foreign buyers, let alone go out to sell them," asserts Mr. Drisko. A case in point: A Finnish manufacturer told him he queried three U. S. builders about a $50,000, standard machine tool. In response to his inquiry, one builder sent a catalog and a price quotation. The other two didn't even answer. The builder who sent the price didn't follow up, and an Italian machine was finally bought. Today, the Finnish company feels it should have worked harder to get help from the U. S. builders—the Italian machine is not entirely satisfactory.

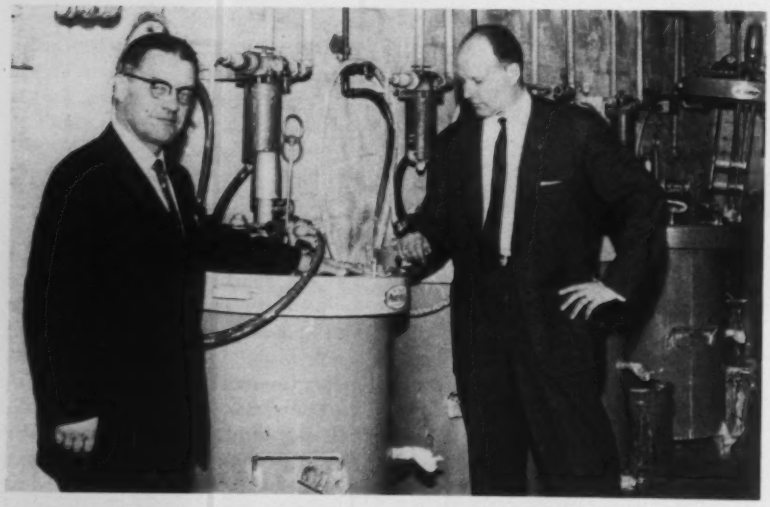
• **Foreign sales can be boosted simply by going after them. Here are some tips.**

U. S. builders have a temporary, but important, advantage over their foreign competitors. Delivery time is shaved a year or more in some cases by U. S. builders. But Mr. Drisko says that when that difference is wiped out, U. S. builders still don't need to surrender to the oft-cited price problem. "Foreign buyers are perfectly willing to pay the difference in cost for the U. S. built machine. But they'll do so only when they know, or when you show them, that the price is justified."

Mr. Drisko criticizes U. S. builders who quote machines on the basis of capacity and other standard measures. Any lathe builder in the world can offer a machine that will take 2 in. diameter stock, he points out. And if that's all you sell, then the cheaper foreign machine sounds equal. "Sell productivity, metal removal rates, tolerance capabilities, and all the other advantages of rugged, high performance U. S. machines. Then, in many cases, the so-called foreign equivalents can't compete."

Another suggestion: Spend some time teaching your foreign salesmen or distributors how to sell. Make sure they know all they need to about the capabilities of your equipment, and make sure they are selling its capabilities, and not its dimensions, price, or capacity.

Further, Mr. Drisko says U. S. builders must be more willing to grant credit to foreign customers, and they must be willing to eliminate some red tape in getting the credit established.



William H. Drisko (left), president, Stone Co., Minneapolis, shown here with Reino F. Ravantti, general manager, Upo Osakeyhtio, Lahti, Finland

• **Finland will be a $100 million market for machine tools in the next five years. It's a good place to start your foreign selling.**

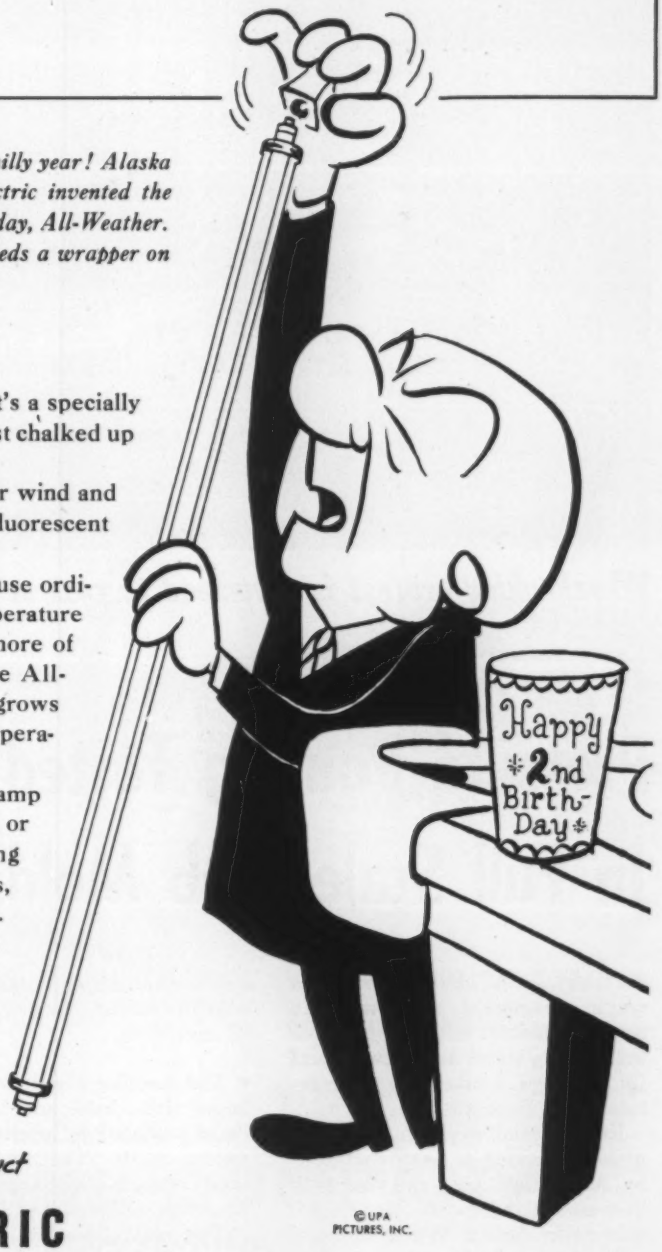
Mr. Drisko feels U. S. machine tool builders, particularly those with standard machine tool lines, can get most of that $100 million market.

He says that Finland will double its metalworking capacity in the next five years. They'll build more capacity for making pulp and paper processing machinery. And they'll expand their basic metal producing capacity (STEEL, July 31, p. 34). In addition, much of Finland's metalworking industry is out to diversify.

First from General Electric (1959)...another bright idea that became a better lamp for you

G-E All-Weather Fluorescents shine brighter when mercury drops

Mister Magoo says . . . "1959? A chilly year! Alaska joined the Union, and General Electric invented the All-Weather fluorescent. Happy birthday, All-Weather. Humph! Packaging experts! Who needs a wrapper on a pool cue?"



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DON'T drop your cue, Mister Magoo. It's a specially jacketed All-Weather lamp, another first chalked up by General Electric.

It wears that glass jacket to ward off winter wind and cold. Below freezing, it's the most powerful fluorescent lamp you can buy.

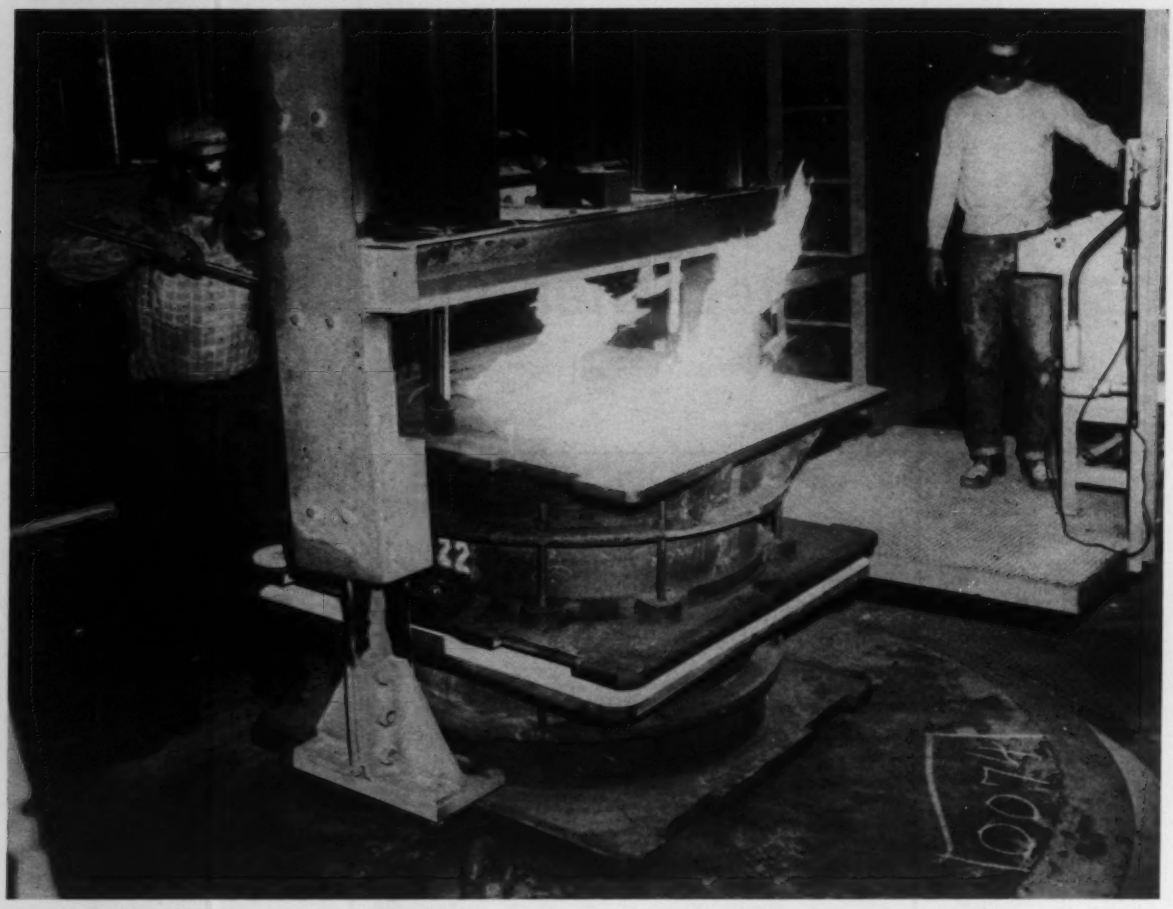
General Electric developed this lamp because ordinary fluorescents grow dim when the temperature dives toward zero. Often they lose 90% or more of their warm-weather light output. But the All-Weather fluorescent T10J—a G-E exclusive—grows brighter the colder it gets! Use it where temperatures sometimes drop below 40°F.

You can use the T10J—or its companion lamp (T10) without the "storm window"—indoors or out. Examples: walk-in freezers, shopping centers, drive-ins, parking lots, street lamps, store fronts, airports, docks, signs, gas stations.

Both come in 4′, 6′, and 8′ lengths. Ask your G-E distributor to show you these two exclusive examples of General Electric lighting leadership. General Electric Co., Large Lamp Dept. C-111, Nela Park, Cleveland 12, Ohio.

Progress Is Our Most Important Product

GENERAL ELECTRIC



Wheelmaking process is revamped to cast semifinished shapes . . .

Pressure Pouring Tested In Full Scale Slab Molds

• DIRECT CASTING of steel slabs on a commercial scale may be proved feasible with a machine that's being tested at Griffin Wheel Co., Chicago, a subsidiary of American Steel Foundries.

Experimental work on controlled pressure pouring is being continued by ASF subsidiaries and licensees. The aim: To adapt the process, developed by Griffin Wheel to make railroad car wheels, to the production of steel shapes suitable for subsequent rolling, forging, piercing, or machining.

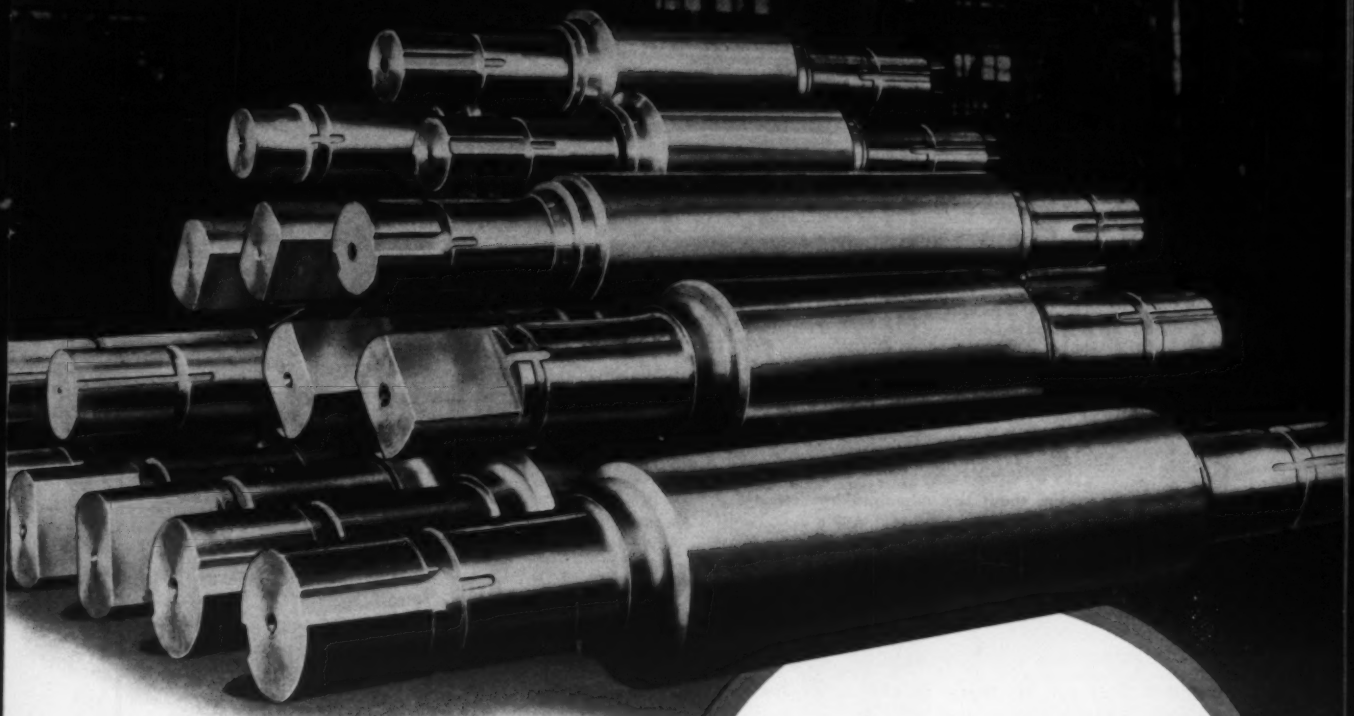
• The machine is expected to make larger slabs, bars, and billets than those produced by previous experimental units. The machine was built at the Lorain, Ohio, plant of American Shipbuilding Co.

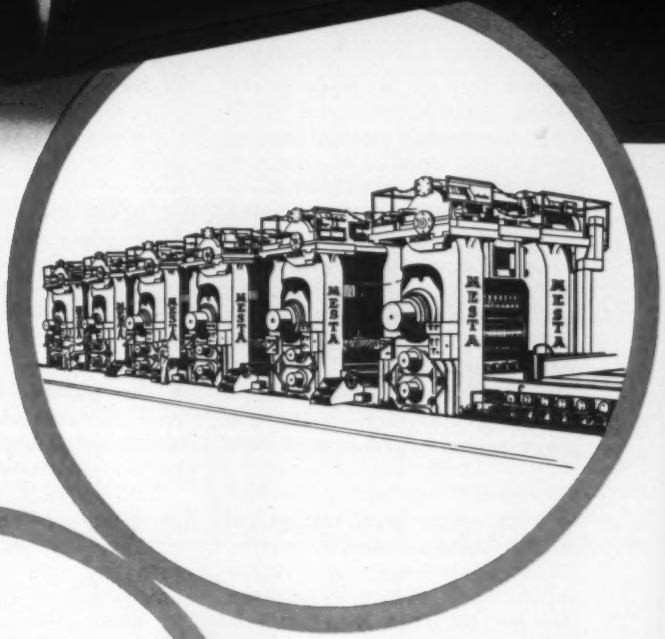
The mold handling mechanism, which passes over the pressure pouring pit on rollers, is expected to make possible the casting of slabs about 25 ft long and up to 65 in. wide. The mold lining is made up of many graphite blocks, in contrast to the one piece, machined graphite linings used in earlier pressure pouring molds.

Experimental work at Griffin Wheel's research laboratory, Bensenville, Ill., during the last three years, has yielded carbon and stainless steel slabs 14 ft long, 3½ ft wide, and 5 in. thick. Pouring time per 5 ton slab: 1 to 2 minutes. Experimental slabs have been rolled into strip and used in a wide range of consumer products.

• Much of ASF's research on pressure pouring is aimed at finding

MESTA ROLLS





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- Mesta Nickel Grain Grade "R" Rolls
- Mesta "Duplex" Rolls
- Mesta Hardened Chill Rolls

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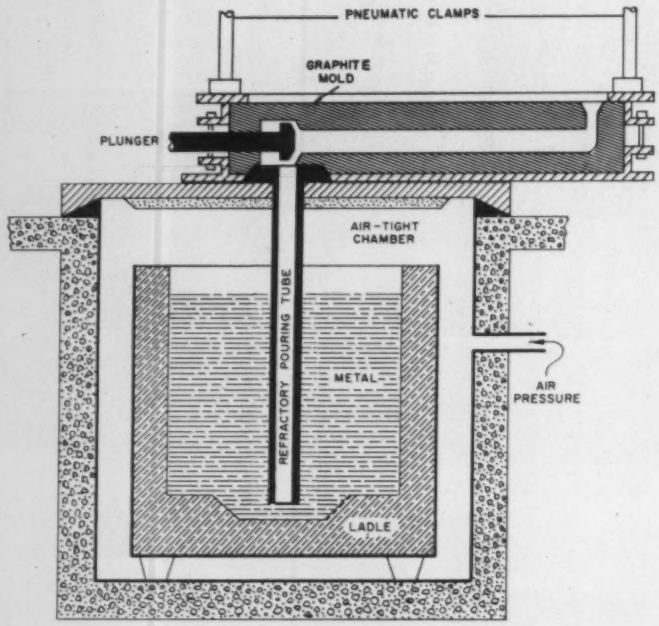


STEEL's editors think the wheelmaking mechanism, adapted to slab-making, would look like this. ASF's new machine may be similar

products that can be made in the company's plants.

An experimental pressure pouring pit has been installed at the company's Indiana Harbor (Ind.) plant. Early trials indicate that direct casting could be a starting point for several types of products—it could produce billets for making welding rods, or special shapes for forging.

Promising results have also been obtained in the direct casting of bimetal shapes, which would have a durable, stainless steel exterior and a less expensive, carbon steel base.

• Licensees are adapting the process to the production of castings and semifinished steel shapes.

License agreements with Washington Steel Corp., Washington, Pa., and Michigan Seamless Tube Co., South Lyon, Mich., were announced recently by Joseph B. Lanterman, ASF president. The pressure pour process will be used by the licensees to make blooms, slabs, billets, and tube rounds.

Encouraging results are reported from Chicago South Works of United States Steel Corp., where the process is being applied to volume steel mill operations. The corporation signed a license agreement in 1959 for direct casting of slabs, blooms, tube rounds, and billets.

Castings that weigh up to 1600 lb are being direct cast at Lebanon Steel Foundry, Lebanon, Pa. The company holds a license (1958) for pressure pouring of foundry products.

• The process eliminates several steps in steelmaking. It provides higher product yield and reduces surface conditioning requirements.

The pressure pour method employs air pressure to force molten steel upward through a ceramic tube and into a semipermanent, graphite mold. The controlled rate at which steel is forced into the mold is said to make for closer tolerances in castings and to provide a surface that requires minimum conditioning.

Five ASF plants are making railroad car wheels by the direct casting process. A sixth, under construction at Bensenville, is slated to go into operation about September.

Specialty Iron Process Makes Use of Charcoal

CHARCOAL IRON, produced to close specifications at Wundowie, Western Australia, is shipped to selective markets in Australia and to buyers in the U. S., Canada, Japan, and several European countries.

Production of the charcoal iron was started in 1948, in a 30 ton a day pilot plant. Present output is 55,000 tons a year, of which 50,000 tons are exported.

• Forests Furnish Fuel — The Wundowie facility uses wood as a major raw material. Australia has abundant iron ore deposits, but it doesn't have high grade coal for metallurgical coke.

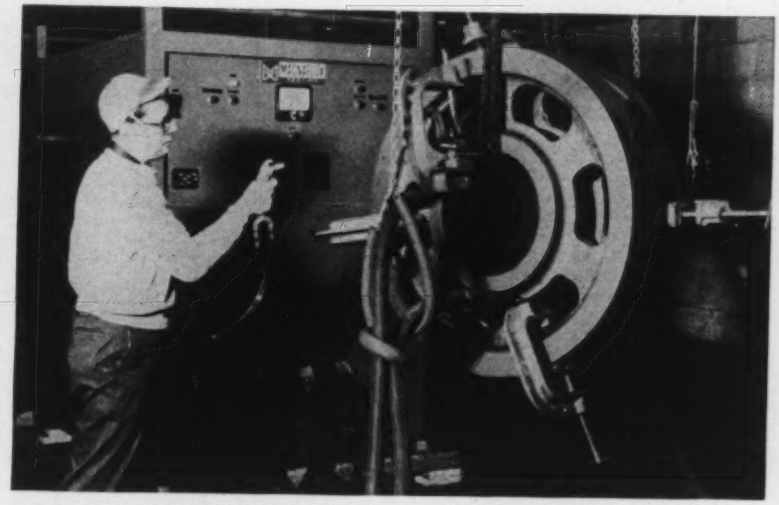
Saw milling and wood distillation are also carried on at the installation. Millable trees are processed for maximum timber recovery, and only waste wood is carbonized.

• High Grade Iron—The charcoal is relatively free of ash; it is useful in making the kind of iron that's needed for special castings. The iron is said to be particularly suitable for ductile types of iron castings, spheroidal cast iron, GS Meehanite, and iron for rollmaking.

Many founders use the iron to correct analyses of lower grade melts, which could not otherwise be used in castings for critical applications. Main iron source: Hematite (62½ per cent iron) from the Koolyanobbing ranges, 200 miles away. The ore is said to be extremely low in sulfur, phosphorus, and other undesirable elements. The hematite is used exclusively in iron for export, but it is mixed with local ore (40 to 45 per cent iron) for Australian use.

• Standard Grades Use Coal—Pig iron for steelmaking and general foundry applications is also produced at the plant. Manufacture of those irons varies from the charcoal process, and employs low ash coal from open pit mines at Collie, several hundred miles south of Perth.

The coal is carbonized in retorts, or placed directly in the blast furnaces as supplementary fuel.



Part is sprayed with fluorescent suspension, then . . .

Inspected under ultraviolet light . . .

Magnetic Method Reduces Inspection Time Over 90%

• MAGNETIC PARTICLE inspection time has been reduced more than 90 per cent by a three way magnetization process at Birdsboro Corp., Birdsboro, Pa. On the basis of present production rates, the machine should pay for itself in nine months, the company estimates.

Birdsboro used magnetic particle inspection procedures previously; the new equipment is based on similar principles.

• The new magnetization procedure eliminates several steps.

To show up potential cracks or flaws, the company had used portable Magnaflux units. Power was applied in one direction only, and several tests were required by internal fillets or cored openings.

Narrow openings had to be reached with test prods, and the average number of particle inspections had been nine; it is now three or four. That saving, the reduction in time per each inspection, has meant a 90 per cent cut in the manhours required to inspect each casting. Further, a backlog of castings had accumulated for inspection; it has been eliminated.

The new machine, built by Magnaflux Corp., Chicago, subsidiary of General Mills Inc., employs what is called the "vector" method. It permits a single magnetization cycle, and a single inspection, to replace several.

• Separate magnetizing currents are directed through three circuits.

The magnetizing unit is rated 8000 amperes, 3 phase, full wave, direct current, and is considered adequate for sectional and over-all magnetization of ferromagnetic castings weighing up to 25 tons.

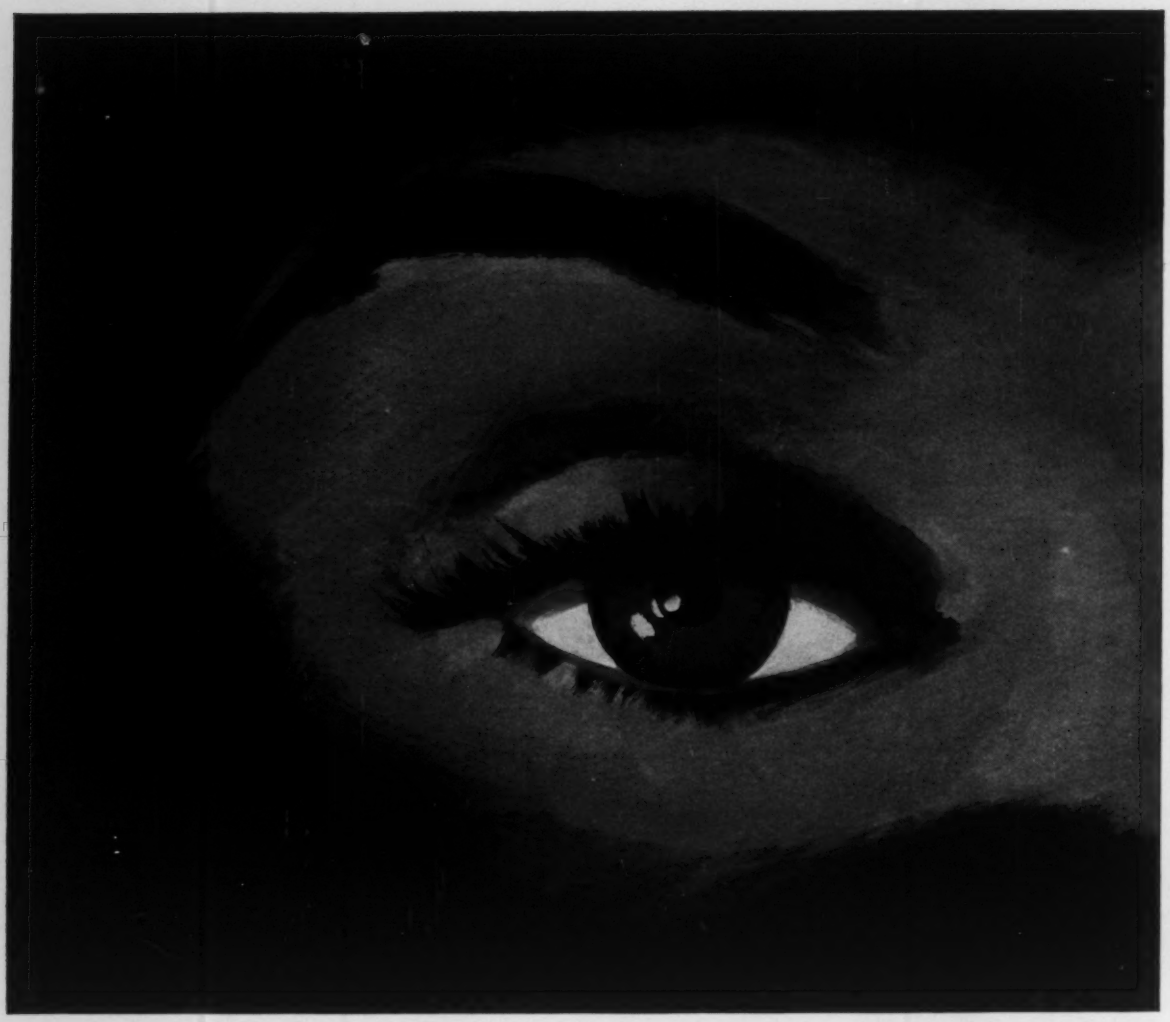
In the magnetization process, separate currents are directed through each of three circuits. While only one magnetic field may exist in a part at one time, the cyclic system results in magnetization in three planes.

• Dry methods have been replaced by wet methods for the developing powder.

While the test casting is being magnetized (a remote switch permits operator control of the power unit) the operator sprays the casting with a water suspension of the fluorescent inspection material. Ultraviolet light is used to see the location of the fluorescent particles that show flaw sites.

• Sensitivity of the vector process aids inspection.

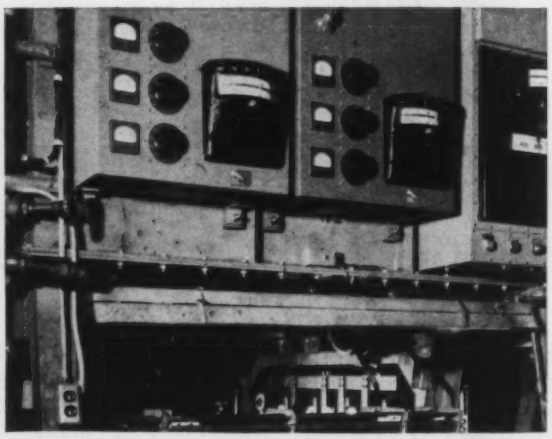
Although the time for inspection has been cut (in the case of the gear pictured, one man does the job in 20 minutes vs. 7 manhours before), the vector method is showing up defects that were difficult to detect by the previous method.



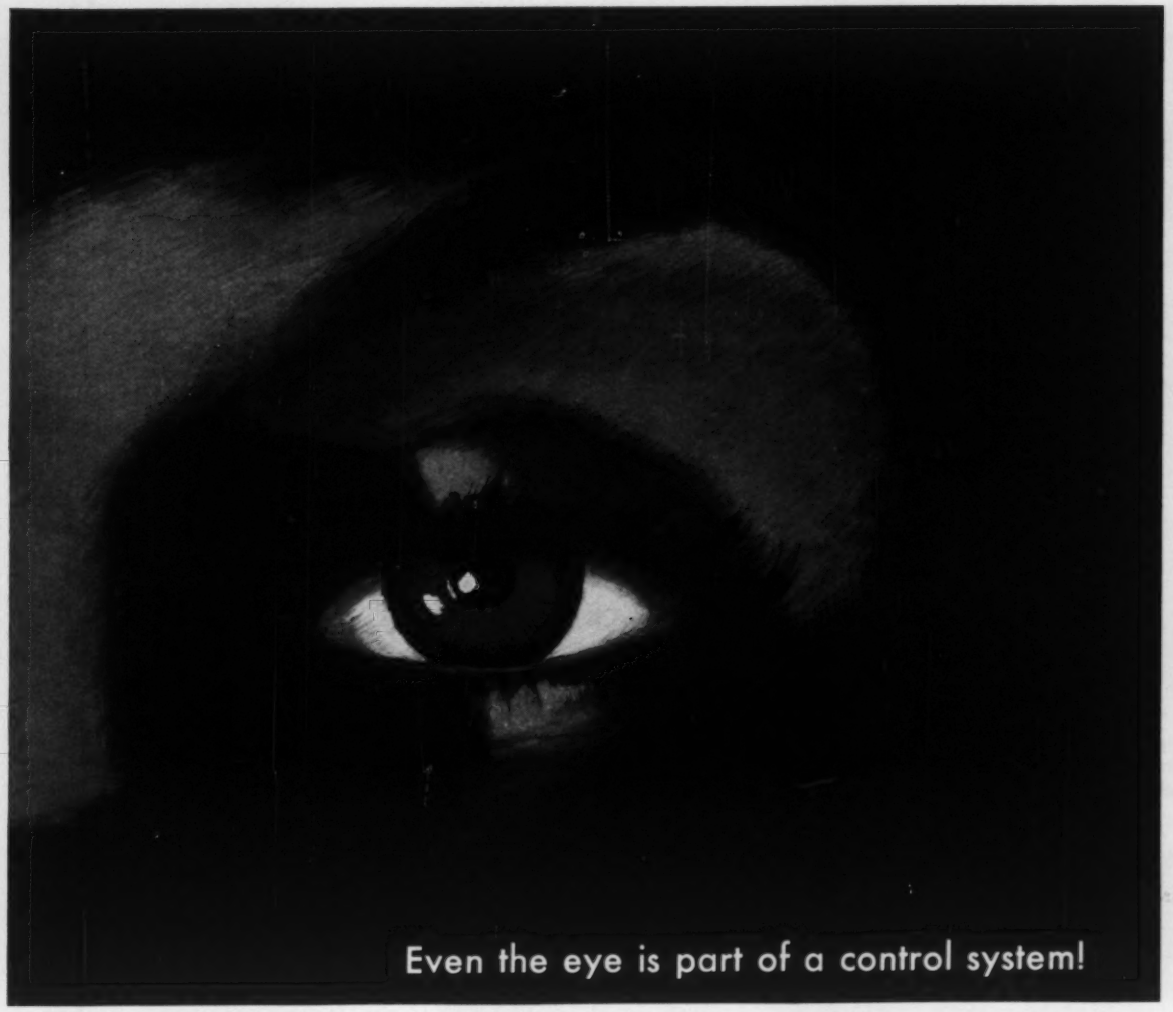
Barber-Colman Automatic

Complete saturable reactor temperature control by Model 407 Capacitrols of wire enameling ovens saves time, bother and heat energy. The appearance of the coatings is improved and abrasion tests show consistently higher coating resistance.

BARBER COLMAN



Industrial Instruments • Automatic Controls • Air Distribution Products • Aircraft Controls • Electrical Components •



Process Control Systems

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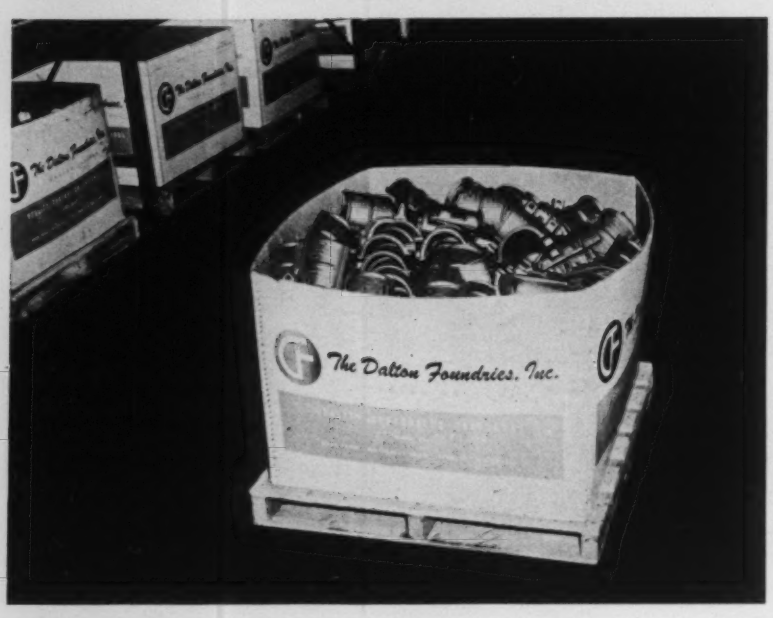


End Handling Problems

• **TWO MAJOR benefits resulted from the adoption of a packaging and material handling program at Dalton Foundries Inc., Warsaw, Ind. Dalton's company and product identification were dramatically improved, and customers realized an estimated 60 per cent saving in handling time.**

"Modern packaging methods and modern sales promotion ideas have vital roles in the foundry industry. This is especially true of packaging. It is here that we are able to give better service and also lower material handling cost for our customers," says Joseph Shellabarger, vice president, industrial sales.

• **The first part of Dalton's two way program covers the flow of castings into customer plants. At one customer's plant, unloading time was reduced from 5 or 6 manhours to 15 minutes.**

In Dalton's finishing, grinding, and cleaning department, 36 x 36 x 24 in. corrugated pallet containers are placed behind every work station. When they are filled, fork lift trucks carry them into storage on metal racks. In filling orders, fork trucks load the pallet containers directly onto contract or commercial carriers for shipment to customers. Container capacity ranges from 1000 to 3000 lb.

• **The other half of the packaging program covers product merchandising.**

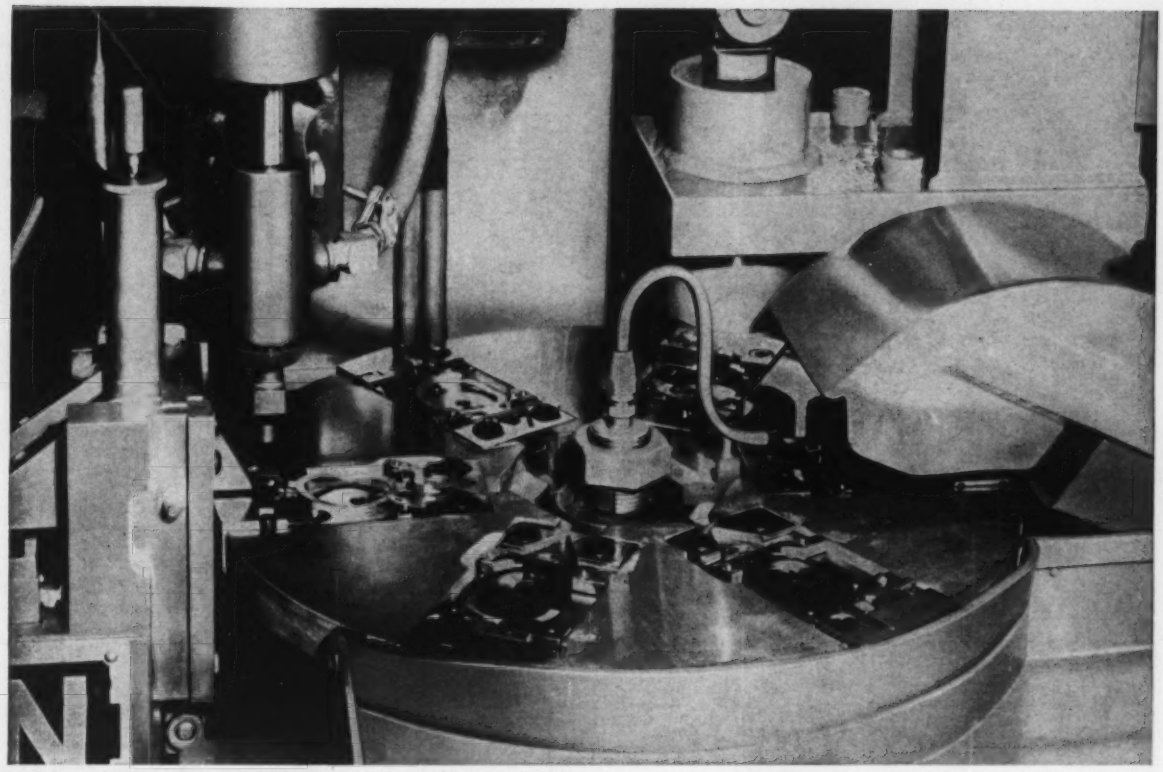
"We want our customers to be able to quickly identify our company and our products. In a customer's plant, such identification also results in substantial savings in material handling costs," says Mr. Shellabarger.

Dalton worked with the Graphic Arts Dept. of Mead Containers Div., Mead Corp., Toledo, Ohio. The design features the company's name, trademark, and products. Red and green are used on the container's whitish liner.

Previously, castings were tossed into metal barrels or heavy wooden boxes, then carried to a large storage area where they were dumped into loose piles on the floor. When they were sold, they were put into burlap bags or wooden or steel containers and transported to carriers by hand trucks or fork lift trucks. In some cases, they were handled individually and piled on truck floors.

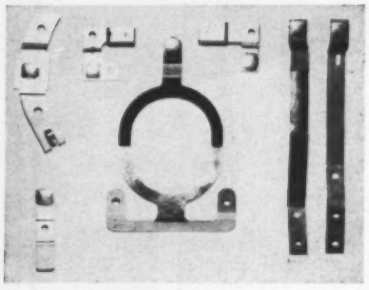
Customers had to go through the same multihandling procedure. Many manhours were piled up by Dalton, carriers, and customers.

The containers used in the program are double walled with Mead's Duo-Arch, serving as a special corrugated medium. They're stored flat in shipment and in storage.



Switch parts are welded, then coined. With interchangeable tooling . . .

Single Purpose Welder Does Seven Jobs



These parts are handled by the same tape welder. The machine has seven index table tops, one for each of the jobs scheduled

• MASS PRODUCTION specialists continue to look for special equipment that will turn out their products at high rates. Yet, more and more, they're also looking for versatility in that equipment.

Take, for example, the welding of electrical contacts at Westinghouse Electric Corp.'s Small Motor Div., Lima, Ohio. The job (motor switch assemblies) is being done at three times the old rate by a relatively conventional index table welder and interchangeable fixtures.

The machine is a magnetic force bench welder.

It has been highly automated with handling, blanking, and forming devices.

• Up to 2600 welds an hour are completed on seven different switch parts on the same machine.

The machine forms electrical contact buttons from a roll of Monel-backed silver tape. A reel feeds the silver tape through measuring, cut-off, and forming stations. Then the mechanism presents the properly oriented contact buttons to the welding stations where they meet other switch parts on the index table.

After welding, the assemblies index to a forming station which coins the contact buttons to final spherical shape. At the next station, an air jet ejects the assemblies down a chute into a storage container.

• Tooling can be changed to accommodate different parts.

Original tooling included seven interchangeable table tops for the seven parts. New tables can be added to permit switch design changes or to take entirely different classes of parts.

Tolerances are critical. The buttons have to be located exactly and be formed to proper contour. Welds must be strong and consistent. Steel, brass, beryllium-copper, and silver are welded.

Quality steel products bearing the YAWATA insignia are exported throughout the world.
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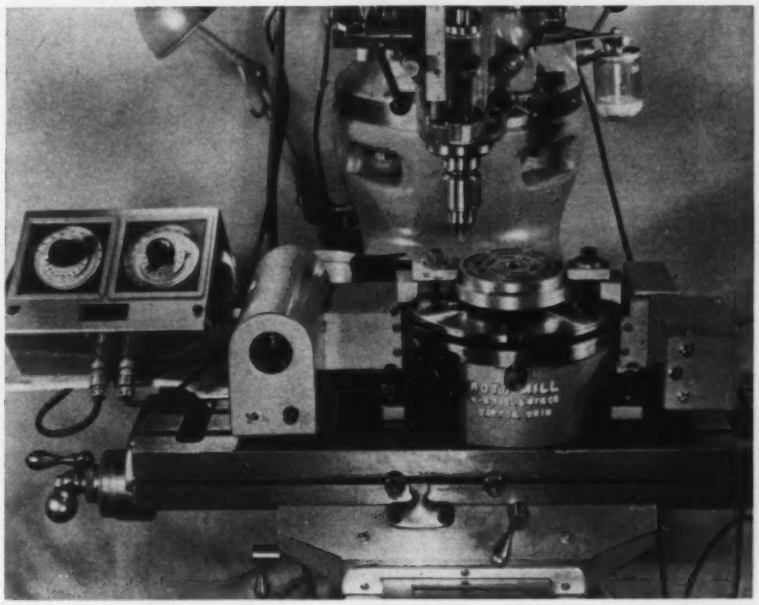
Programing of Index Table Eliminates Errors

AUTOMATIC spacing of hole patterns in degrees, ½ degree, or 1/10 degree increments is possible with the M-M 800 Roto Mill electronic index table.

It can also be used for programing a part that requires milling of slots. With a 15 in. program plate, the M-M 800 can program uneven indexes.

The company says the ability to program to the application eliminates many opportunities for errors that exist with hand operated index tables. The unit may be used in a vertical or horizontal position. It's designed for drilling, boring, jig boring, checking, milling, spacing, and many other similar applications.

For further information, *write* M & M Tool & Mfg. Co., 1124 E. Third St., Dayton, Ohio.



Savings Stressed in Decoiling, Shearing Line

THIS AUTOMATIC decoiling and cut to length line for users of mild, cold rolled, steel sheets lowers costs, says the maker, in half a dozen important categories: 1. Material. 2. Scrap. 3. Labor. 4. Inventory. 5. Storage. 6. Production.

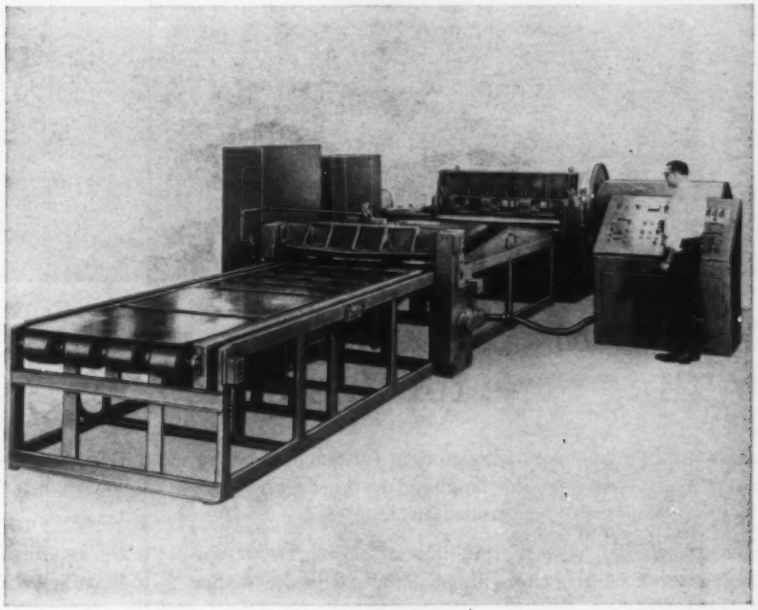
The basic line consists of a coil reel, a straightener or leveler-measuring unit, a hump table, a shear, and a conveyor unit.

The triple-backed leveler does combination straightening or leveling and measuring. It's equipped with powered pinch rolls and measuring rolls. A rotary transducer indicates linear feet.

Various capacities are available up to a maximum sheet thickness of 3/16 in. and a maximum width of 72 in. A cut length accuracy of ±0.008 in. can be provided.

Optional equipment (such as a

(*Please turn to Page* 86)

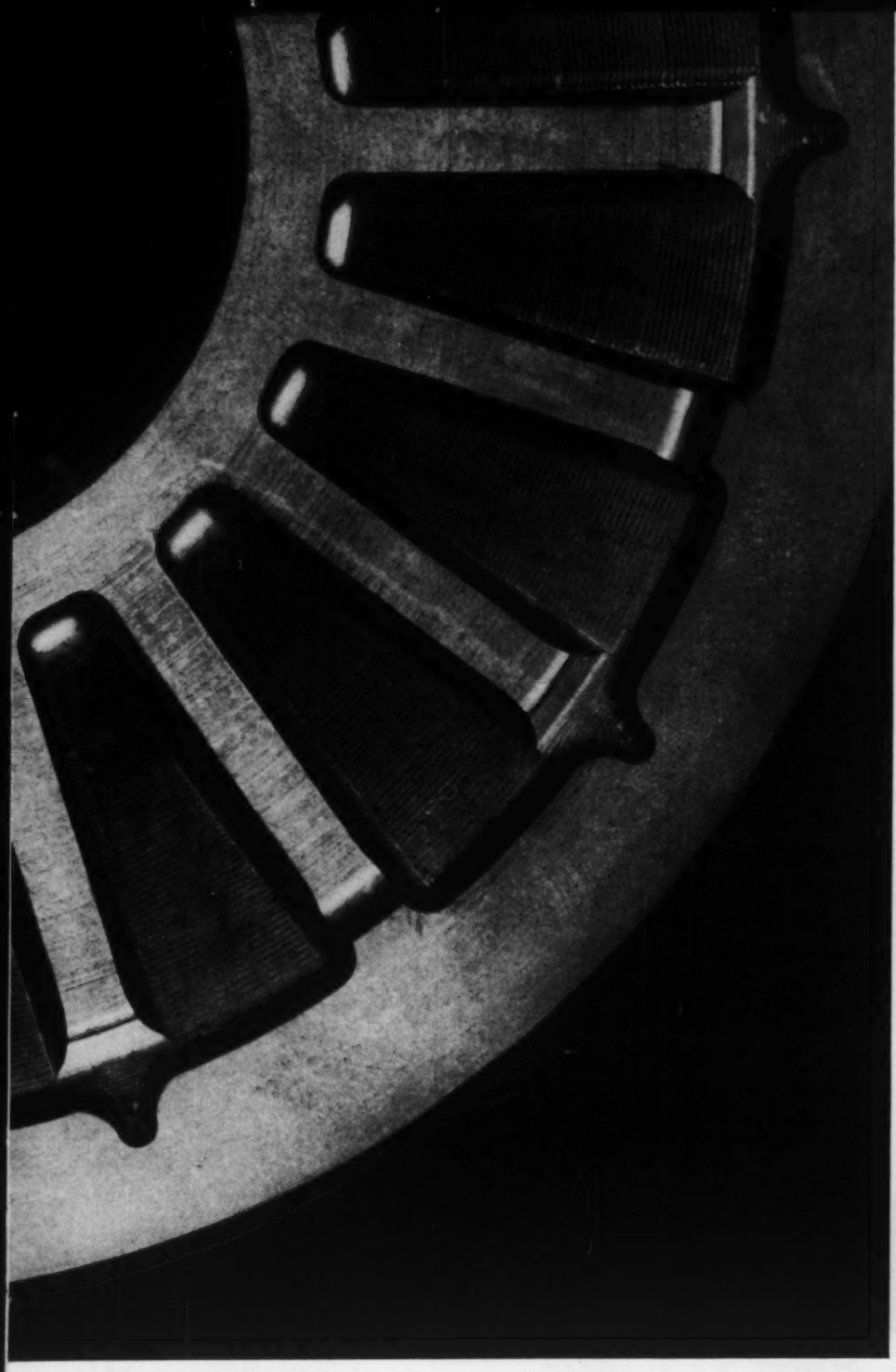


New IBM computer language...AUTOPROMT cuts milling time for this helicopter gearbox cover by 75%

AUTOPROMT (AUTOmatic PROgramming for Machine Tools) is a powerful new computer language designed to broaden the use of numerically-controlled machine tools.

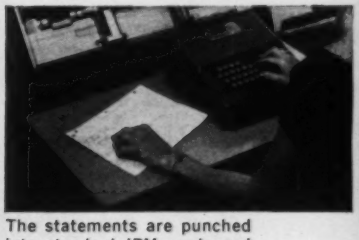
AUTOPROMT, for the first time, lets an engineer *describe the surfaces* of the three-dimensional shape he wants milled, *rather than calculating every path* the tool must follow in order to machine the part.

AUTOPROMT leaves to the computer the task of automatically generating these tool paths. You describe the part to be milled and the tool to be used in simple, *English-like*



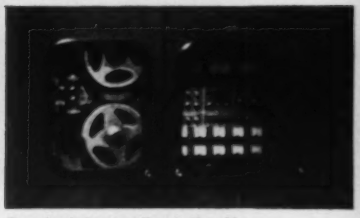
Here's the way AUTOPROMT works at United Aircraft Corporation

The Parts Programmer, using a conventional blueprint, prepares 180 one-line statements in AUTOPROMT language.



The statements are punched into standard IBM cards and entered into the IBM 7090 Data Processing System. (AUTOPROMT also works with the 704 and 709 Systems).

The 7090, programmed with AUTOPROMT, produces 8000 tool path instructions needed to direct the Pratt and Whitney Co. Inc. Numeric-Keller Continuous Path Milling Machine.



Punched tapes direct the Numeric-Keller Milling Machine.

The Numeric-Keller mills the helicopter gearbox cover.

terms. The computer does the laborious calculating work.

AUTOPROMT produces results like these: the time to mill the gearbox shown in the photographs cut to *one-fourth* the machine time required by conventional methods. AUTOPROMT reduced the lead time from blueprint to production *from three months to two weeks.*

AUTOPROMT is available to IBM customers. Call your local IBM Representative for complete details on this latest advance in Numerical Control of machine tools.

IBM®
DATA PROCESSING

NEW PRODUCTS and equipment

(*Concluded from Page* 83)

coil ramp, coil lift, peeler for heavy gage materials, tracking device, edge trimmer, scrap chopper, and stacking unit) is available.

The line has a centralized control system which includes a control console, auxiliary electrical control cabinets, variable speed drive unit, interconnecting wiring, terminal boxes, conduit, and related equipment. All wires are numbered and mounted to terminal strips (to facilitate disassembly and reassembly).

For further information, *write* Dept. 353, Lennox Tool & Machine Builders, a division of Lennox Industries Inc., Lima, Ohio.

Alphanumeric Capability Featured on Data System

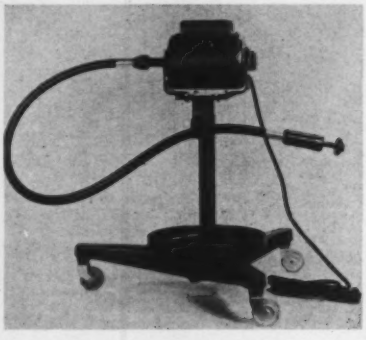
INTEGRATION of the Burroughs Series E, desk size computer with a 10 total typewriter accounting machine provides a business data processing system with alphanumeric capability.

The company says the alphabetical feature eliminates the need for additional units to write descriptive information on accounting forms. Programer training amounts to a few hours with the simplified external pinboard command process. Data can be fed into the system by adding two punched paper tape readers and a punched card unit or three tape units. A third option is two punch card units. Output can be either by a tape or card punching device, or both.

For further information, *write* Equipment & Systems Div., Burroughs Corp., 6071 Second Blvd., Detroit 32, Mich.

Flexible Shaft Unit Has Quick Change Attachments

ATTACHMENTS to the Lightning flexible shaft machine equipped with a quick-disconnect handpiece can be connected in seconds. A 5 or 6 ft flexible toolshaft is provided.



The bench height pedestal is convenient for bench work, grinding, brushing, or buffing operations. The unit operates at 1750 rpm (⅓ or ½ hp motor).

For further information, *write* Stow Mfg. Co., 63 Shear St., Binghamton, N. Y.

Refrigeration Unit Compact, Lightweight

A HERMETIC, centrifugal refrigeration machine, the Tonrac, is available in eight sizes from 50 to 100 tons (refrigeration capacity) and with dimensions compact

RA 330® brings the space age **CLOSER**

RA 330 supports rocket cases in pit furnace 10 ft. diameter by 30 ft. deep.

RA 330 provides strength at 1900° F. to support, without fear of dropping, a 3500 pound load; resistance to thermal shock of rapid heating and air quenching; resistance to furnace atmosphere and oxidation.

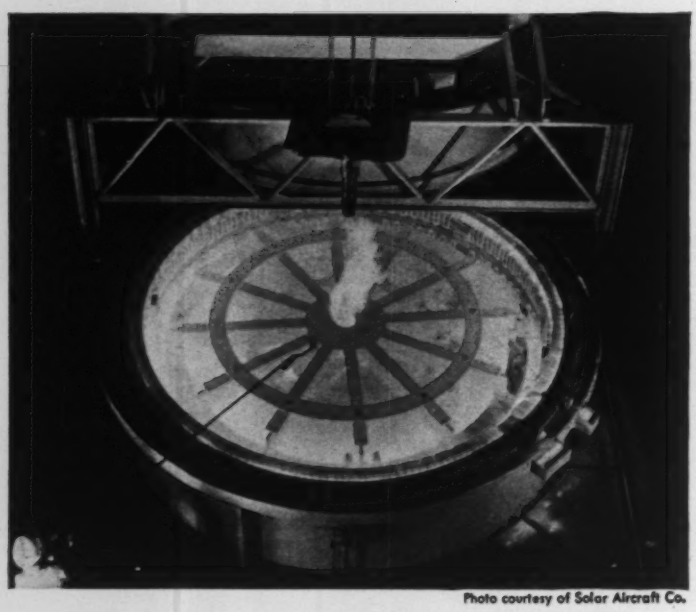


Photo courtesy of Solar Aircraft Co.

Based upon highly successful use of RA 330 in other applications with temperatures ranging up to 2250° F., Solar Aircraft Company selected RA 330 for this critical application.

For best performance specify RA 330 for your heat treating fixtures and furnace parts.

Rolled Alloys Heat Resisting Alloy Specialists will gladly be of service. For technical data—send for Bulletin No. 107.

ROLLED ALLOYS, INC.
Heat and Corrosion Resistant Alloy Specialists
5309 Concord Avenue • Detroit 11, Michigan
330 William Street • South River, New Jersey

enough to pass through a standard, 36 in. wide, doorway.

The major significance of the centrifugal type unit is compactness, less costly building support requirements, and the elimination of field assembly and on-the-job hookup of auxiliary water piping, refrigerant piping and control tubing, says A. O'B. Andrews, Industrial Div. president. The unit uses an electric motor cooled by the liquid refrigerant to drive the compressor at 18,000 rpm. Mr. Andrews points out that the unit is estimated to weigh less than 1/10 as much as other designs.

For further information, *write* Industrial Div., American Radiator & Standard Sanitary Corp., Tireman at Roselawn, Detroit 32, Mich.

Arcwelder Has Simplified Controls

SIMPLIFIED controls for gas shielded and submerged arcwelding are featured on the Westinghouse RCP Industrial dc unit for semiautomatic and automatic operation.

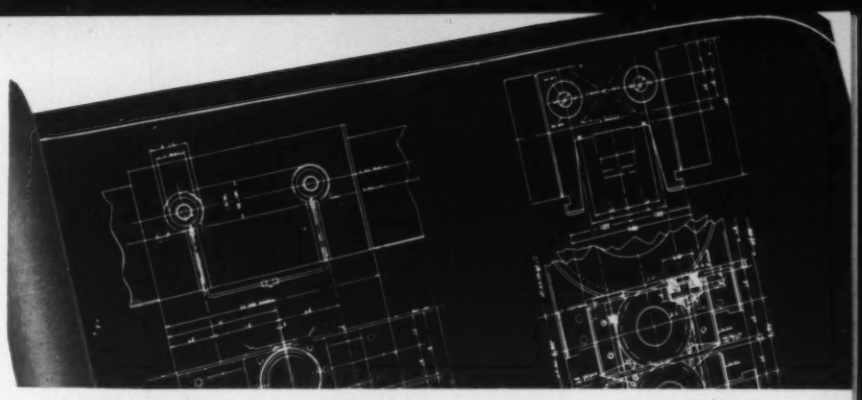
The company says the selenium rectifier power source (500 to 600 amperes) is designed to meet the demands of a majority of arcwelding processes in metalworking. The unit provides relatively flat volt-ampere characteristics for maximum arc stability in automatic and semiautomatic welding. Arc starting and recovery are practically instant and burnback and stubbing are reduced.

Other features include open circuit voltage control, weatherproof construction, and the Westinghouse de-ion lifeline starter welder control. The RCP welders may be connected in parallel or series to provide welding current or voltage as required. A 1 kva auxiliary transformer is part of the standard equipment.

For further information, *write* Westing-Arc Dept., Westinghouse Electric Corp., Buffalo 5, N. Y.

Rustproofing Oil Protects Parts in Process, Storage

AN IMPROVED, light duty, rustproofing oil developed by Enthone is designed to provide temporary protection to parts in process, in



Blueprint of a new process

by "YOUNGSTOWN"

One of Many Major Developments for Industry during 75 YEARS of Service

Have you heard about Work Roll Shaping? It's a unique method for assuring uniform flatness of steel strip. Reports from users of installations already in operation indicate remarkable results. This is just one of the recent "Youngstown" developments which improve rolling mill operations. Complete information will be furnished, without obligation, on any of the following:

- *Hydraulic Work Roll Shape Control*
  Improves the quality of strip—economically
- *Automatic, Heavy Duty, Contour Roll Lathes*
  Modern design for templet or numerical control
- *New Carriage-Type Stretcher Levelers*
  Sizes from 10,000# to 4,000,000#. Fast, efficient
- *500 fpm—81" Sheet Scrubber Line*
  Cleans sheets up to 76" wide and .250" thick
- *New Rotary-Type Plate Scrap Chopper*
  Unique reciprocating design prolongs knife life
- *Coil Processors and Scale Breakers*
  New concept of coil processing and scale breaking

Other recent contracts range from complete turnkey installations to auxiliary components. Whatever the need—large or small—you benefit from "Youngstown" experience.

THE YOUNGSTOWN FOUNDRY & MACHINE CO. 75th SERVING INDUSTRY SINCE 1886

The Youngstown Foundry & Machine Co.

Youngstown 1, Ohio

40

storage, or during shipment.

Plain carbon steel dipped in the full strength organic liquid (Entek RPO-12) will withstand 40 hours of exposure to salt spray (using Federal Test Standard No. 151) or more than 45 days of exposure to tropical humidity tests (100 per cent humidity at 100° F). In addition, the company says the material is ideal for use after blackening, dry or wet grinding, machining, sand blasting, tumbling of iron and steel parts, or to protect steel tools and dies when not being used.

The material may be applied by dipping, spraying, brushing, or tumbling. For maximum rust protection (up to one year) and optimum water displacing ability, the company advises using the material at full strength. Limited rust protection may be provided by diluting the material with safety solvent—1 part solvent to 1 part rustproofing oil by volume. The oil is not recommended for protection against outdoor exposure. It has shown superior resistance to moist acid and alkaline fumes from pickling and aluminum etching solutions, says the company.

For further information, *write* Enthone Inc., 442 Elm St., New Haven 8, Conn.

Plastic Journal Bearings Withstand Heat, Cold

PLASTIC journal bearings that function efficiently at temperatures up to 600° F and in the cryogenic range have been fabricated from Duroid 5813, a reinforced Teflon of high lubricity.

Developed by Rogers Corp. for applications where lubrication is impossible or undesirable, the key advantage of the material is that dirt, fibers, or debris will not adhere to it. The company says the material is being successfully used as retainers for microprecision bearings.

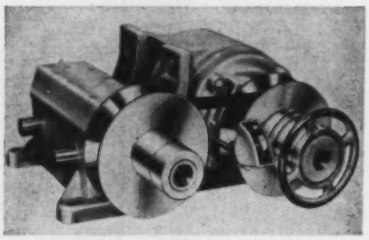
Bondable to metal, the plastic bearings can be used to replace worn inserts in machinery or without a metal backing as original equipment in new designs. While they can be bonded to any metal, dead soft metal grades are most satisfactory.

Other properties include a thermal expansion equivalent to aluminum, no cold flow problems, and no dimension change due to moisture.

For further information, *write* Rogers Corp., Rogers, Conn., or Smith & Klebes, New Britain, Conn.

Variable Speed Drive Rating Goes up to 10 hp

YOU CAN assemble 3, 5, 7½, and 10 hp drives with the 410 horizontal countershaft. The motor mounts at either side of the countershaft.



Lewellen variable speed pulleys provide an 8:1 range of speed variation. Manual or automatic regulators control speeds. The assembled drive can be installed on the floor, wall, or ceiling with shafts in horizontal or vertical position.

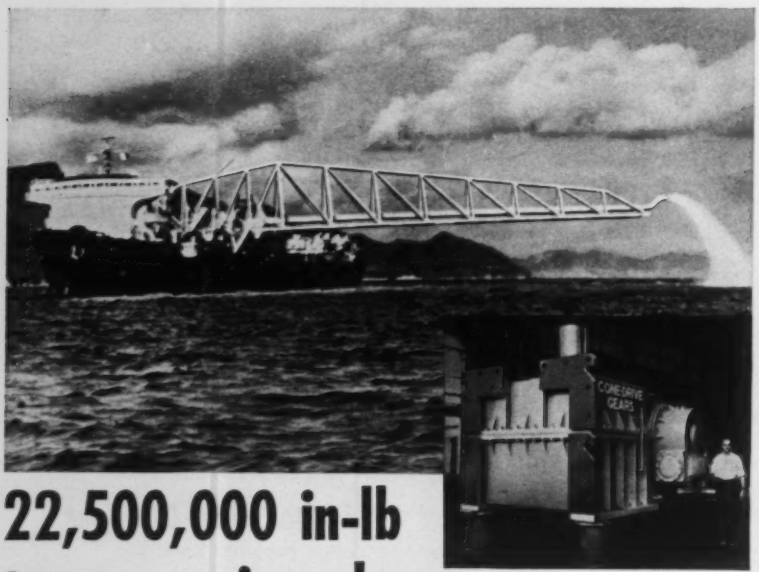
For further information, *write* Lewellen Mfg. Co., 1428 Tenth St., Columbus, Ind.

Automatic Indexing Unit Drills, Chamfers, Reams

AN AUTOMATIC indexing machine for drilling, chamfering, reaming, and tapping forged steel ells and tees in nominal pipe sizes to 1 in. has been developed by Swift Ohio Corp.

Using two spindles and machining two pieces at a time, the machine performs three operations: 1. Subland drills (high speed). 2. Reams—to locate accuracy of hole alignment. 3. Taps—using Scully-Jones, adjustable, floating tapholders.

Hourly capacity is two hundred



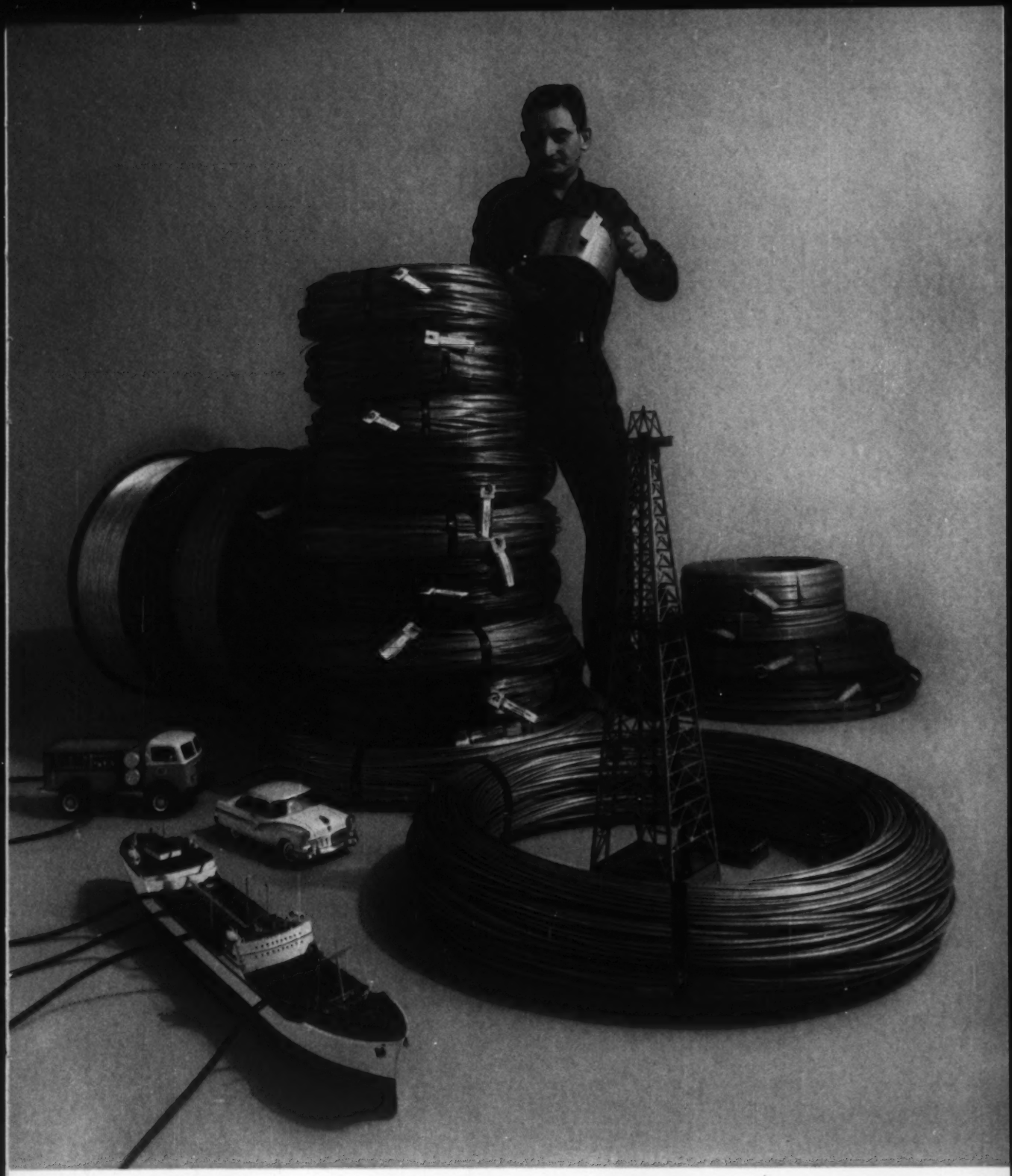
22,500,000 in-lb torque swings boom

This ocean-going dredge "Zulia" has a 437' discharge boom that rotates 180° to pump waste beyond a channel project's limits. The Cone-Drive speed reducer that does the job is shown in the inset. Due to the **double-enveloping worm** gear principle, this compact housing is capable of producing 22,500,000 in-lb torque—sufficient to "stow away" the giant boom in a 75 MPH wind.

Powerful Cone-Drive worm gearing is available in gearsets, speed reducers and gearmotors.

CONE-DRIVE GEARS

DIVISION MICHIGAN TOOL CO.
7171 E. McNichols Rd., Detroit 12



Strong Restraining Influences...

Roebling Hose Reinforcing Wire

Roebling Hose Wire, Hose Reinforcing Wire and Hose Wrapping Wire bear the stamp of Roebling's strict attention to constant uniformity. As with all Roebling wire products, each is wholly Roebling-made and Roebling-controlled, from open hearth to packaging. Tensile strength and forming qualities, finish and gage are of an excellence that proves itself in use.

Resistance to internal and external pressures and wear are what you look for in hose wires and what you pay for. With Roebling, you *get* them.

For further information on these and other Roebling quality products, write or call Roebling's, Wire and Cold Rolled Steel Products Division, Trenton 2, New Jersey.

Roebling...Your Product is better for it

ROEBLING

Branch Offices in Principal Cities
John A. Roebling's Sons Division
The Colorado Fuel and Iron Corporation

13-20

Low Cost Computer for the Steel Industry

A sophisticated low-priced control computer with capabilities ranging from simple logging to closed-loop control, the RW-330 brings you a new standard in flexibility. You can start with a small basic system that matches your current requirements and then add capabilities as you need them.

TRW Computers Company has successfully installed more digital control computers than any other manufacturer. Because RW-330 design is based on this experience, you are assured that an RW-330 system offers the greatest value per dollar in computer hardware – in flexibility, reliability, efficiency.

RW-330 FLEXIBILITY– Memory sizes range from 4,000 to over 100,000 words; analog input capacity from 0 to over 1,000; an optional subsystem permits automatic scanning and alarm functions to proceed independently of the computer's control program. A similar degree of flexibility is afforded by the RW-330's analog-output system, priority interrupt circuits, digital input-output equipment, fast-access storage, and command structure.

RW-330's are supplied in cabinets that match the application: rugged cabinets for harsh industrial environment, air purgable cabinets for hazardous environment, or standard control-room cabinets.

RW-330 CAPABILITIES – RW-330 computing speeds exceed those of competitively priced machines; addition instructions can be performed in 260 microseconds, including access time.

TRW Computers Company

a division of ***Thompson Ramo Wooldridge Inc.***

TO FIND OUT HOW THE RW-330 CAN BE APPLIED TO YOUR CONTROL PROBLEM, CONTACT ANY OF THE TRW COMPUTERS COMPANY OFFICES LISTED BELOW.

220 North Canon Drive
BEVERLY HILLS, CALIFORNIA

1510 Esperson Building
HOUSTON, TEXAS

200 East 42nd Street
NEW YORK 17, NEW YORK

200 South Michigan Avenue
CHICAGO, ILLINOIS

3272 Peach Tree Road, N.E.
ATLANTA 5, GEORGIA

13-3C

The RW-330 in the Steel Industry

An RW-330 digital computer will control the basic oxygen furnaces at Great Lakes Steel Corporation, Detroit division of National Steel Corporation. Given raw-material data and end-product specifications, the RW-330 will compute and control additive requirements and control the flow rate and duration of the oxygen blow. By correlating data on finished ingot characteristics with records of furnace operation, the RW-330 will automatically determine the best set of operating conditions for subsequent batches. RW-330 control will minimize the consumption of raw materials and will ensure product quality.

An RW-330 can control many other conversion and finishing operations. It can be applied to any control job — large or small — and you pay for only as much computing and control capacity as you need because the RW-330 is flexible in size. You can later expand your system for data logging and closed-loop control of additional plant operations.

The RW-330 is ideal for an "evolutionary" control system. The basic computer provides you an economical means of gathering and interpreting data on the operation of a specific process. From this information, a closed-loop control system can be developed, and your RW-330 can be expanded to do the job while gathering information on other processes. Thus, RW-330 expandability gives you a gradual, or evolutionary extension of automatic control.

Investigate the RW-330 in the light of your own requirements today.

TRW Computers Company

a division of Thompson Ramo Wooldridge Inc.

8433 Fallbrook Avenue, Canoga Park, California

NEW PRODUCTS and equipment

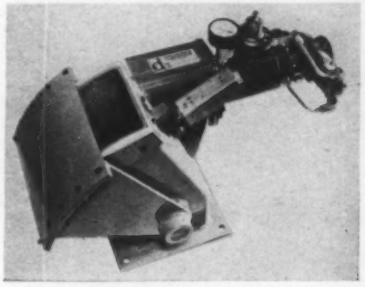
3/8 in tees and ells, steel forgings, high pressure fittings and three hundred 1 in. tees and ells, steel forgings, and high pressure fittings with ±0.005 accuracy of line holes.

The basic machine includes a six station, 84 in. diameter, indexing table; wing bases, columns, non-rotating center table top; and two spindle and special power drilling units for mounting on the table top. It also has three special tapping units, a hydraulic power unit and valves, coolant system, six dual spindle heads, bushing plates, and brackets.

For further information, *write* Swift Ohio Corp., Kenton, Ohio.

Swing Gate Feeder Moves Free Flowing Materials

A SWING gate feeder for free flowing materials controls movement into automatic weighing systems or continuous process streams.



The unit is available with a two position, full on-off control, or with a modulated feed control to obtain full flow to cutoff with modulated response. It's a heavy duty unit, self-cleaning, and can be obtained in a wide range of flow rates.

For further information, *write* Dynametrics Corp., Northwest Industrial Park, Burlington, Mass.

Sensitive Instrument Monitors up to 10 Points

AN INSTRUMENT called the Thermo electronic economy monitor is said to provide accurate, sensitive, low cost monitoring of one to ten points to be checked for the same value.

Applications include monitoring temperature, pressure, speed, pH, flow, or any process variable measurable by transducers generating dc millivolt outputs, or changes in resistance.

The unit is available with a null balance potentiometer or bridge type measuring circuit and a ten point scanning mechanism. Each point to be monitored is scanned in sequence and its value compared with a pre-established setpoint. High or low deviations (from setpoint) at any of the monitored points will cause the unit to give a visual indication and shut down the process or processes involved.

For further information, *write* Thermo Electric Co. Inc., Saddle Brook, N. J.

Fine Finish Produced By Broaching Machine

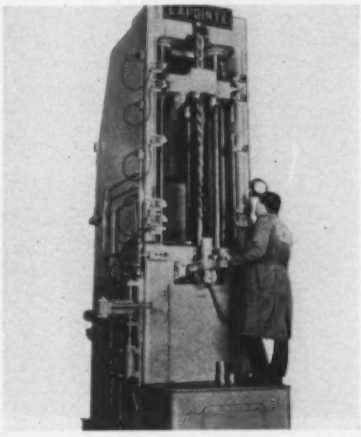
NO CHATTER and the substantially improved surface finish are advantages of a broaching machine designed by Lapointe. The setup uses a pair of matched ball screws to pull the broach, with the broach and the twin screws arranged for direct in-line pull. A broach following attachment gives added stability by guiding throughout the full cutting stroke.

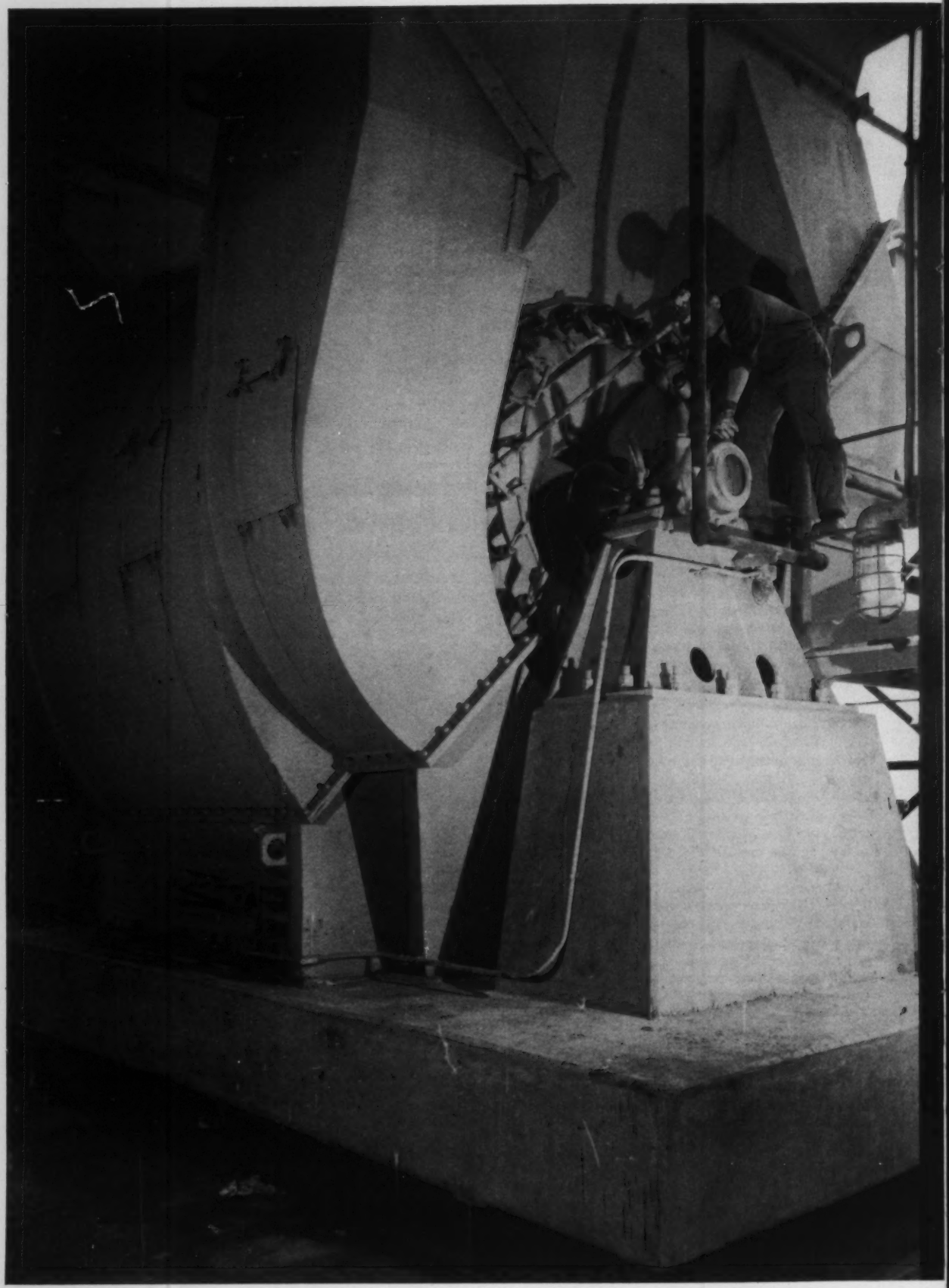
The machine is Lapointe's Model VUE-4.

It's powered by a 30 hp, electromechanical drive.

Joseph P. Crosby, vice president-sales, says that one gear manufacturer plans to eliminate his final gear shaving operation because of

(*Please turn to Page* 94)





RD Fan used for induced draft on basic oxygen furnace of large steel producer. There are four identical units, each producing 325,000 cfm against a static pressure of 15" wg at 550° F.

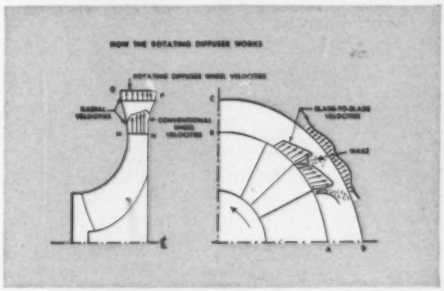
JOY RD FANS CAN PROVIDE PRESSURES UP TO 4.5 PSI AND CAPACITIES UP TO 600,000 CFM

Joy RD Centrifugal Fans, based on a new concept in fan design, can provide any volume of air or gas at pressures up to 4.5 psi in a single stage. This means important savings in initial cost. An equally important saving is their high efficiency over a wide range of volume, which is especially important where load fluctuates. Surging, even on parallel operation, is no problem because the RD Fan is inherently resistant to pressure surge over its entire duty range.

These advantages of the RD Fan are the results of its unique rotating diffuser. Instead of stationary diffusers, the RD diffuser is an integral part of the wheel—added at the blade tips. The rotating diffuser reduces the gas velocity before leaving the wheel and up to 98% of the conversion of velocity to pressure is accomplished with the wheel of the RD Fan.

Radial blades in the RD Fan tend to be self cleaning, even when handling dust laden and dirty gases. The rotating diffuser results in low noise levels because of the lower and more regular velocities leaving the wheel and because the blade tips are remote from the cut-off.

The Joy RD Fan is finding steady acceptance in induced draft and forced draft applications in the steel and power industries, in handling chemical process gases, and in heavy duty industrial applications. For extremely dirty or corrosive applications the entire unit may be fabricated of stainless steel. Parts are simple because there are no large castings or close running tolerances. For complete information and duty areas of the RD Fan, write for bulletin 3449-72.

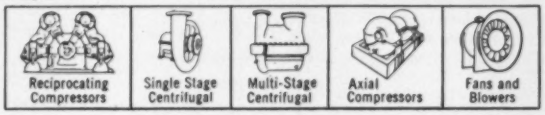


HOW THE ROTATING DIFFUSER WORKS

Studies have shown that radial velocities leaving conventional wheels are unequally distributed, as shown in MN. Also there is fluctuation in the blade-to-blade velocities based on $\frac{nN}{60}$ where n is the number of blades and N is the speed in rpm. The Rotating Diffuser reduces the gas velocity before leaving the wheel, which allows more uniform flow as shown at OP and CD. Without the rotating diffuser, velocities are much higher and erratic as shown at AB and MN, causing turbulence, friction losses.

Joy RD Fan at eastern CO_2 plant. Unit has capacity of 27,800 cfm, at 3 psi. Drive is a 450 hp steam turbine.

AIR MOVING EQUIPMENT FOR ALL INDUSTRY



JOY

Joy Manufacturing Company
Oliver Building, Pittsburgh 22, Pa.

In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario

NEW PRODUCTS and equipment

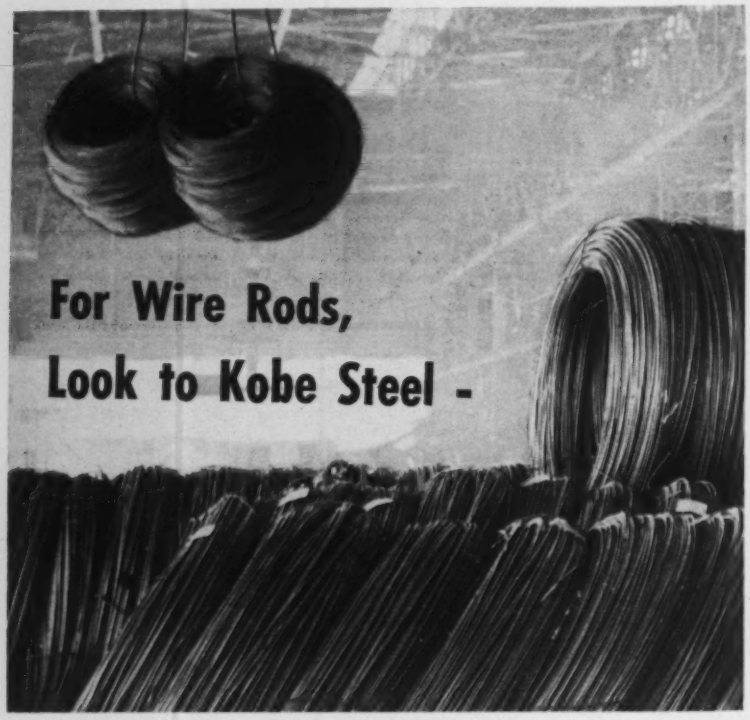
(*Concluded from Page 91*)

the smoothness and accuracy of the Lapointe machine. Mr. Crosby feels that there are a great many other applications where the broaching principle will eliminate finishing operations. In addition, the absence of chatter is said to provide 50 per cent or more improvement in tool life.

The machine shown has a 72 in. stroke and was developed to broach an automotive pump gear. Pushbutton electrical controls provide manual, semiautomatic, or automatic operation and an independent auxiliary hydraulic system operates the fixture and broach lifter mechanism.

The machine is built to operate at infinitely variable speeds, from 5 to 40 fpm. A dual speed feature permits changing the broaching speed automatically at any predetermined point in the broaching stroke.

For further information, *write* Lapointe Machine Tool Co., Hudson, Mass.



with 35 years of experience in the production of mild steel wire rods, and a proud record of being the first to produce hard steel wire rods in Japan over 30 years ago.

Kobe Steel, with the complesion of its new No. 5 mill in June of 1961, now has production capacity of 740,000 tons annually and is known as the oldest, largest and most versatile manufacturer of steel wire rods in the Far East.

Particularly famous for the high quality of its hard steel and special steel wire rods, Kobe Steel exports to every major area of the world.

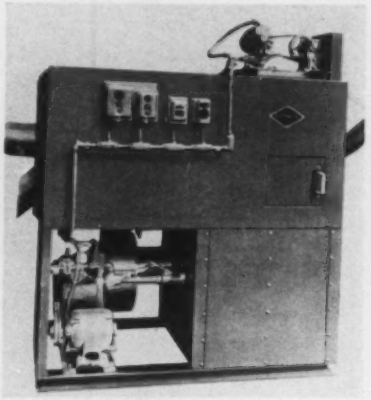
KOBE STEEL WORKS, LTD.

Head Office: Kobe, Japan Cable: "KOBESTEEL KOBE"
New York Office: 80 Pine St., New York 5, N.Y., U.S.A.
Düsseldorf Office: Immermann St., 10, Düsseldorf, West Germany

Main Products: Wire Products — Plain and Galvanized Iron Wire • Barbed Wire • Wire Nail • Wire Rope • Strand Wire for Prestressed Concrete • Bars, Pipes and Tubes • Arc Welding Electrodes • General Machinery

Rotary Drum Unit Dries Production Lots

DESIGNED especially for mass production drying in the plating industry, a rotary drum type drying unit produced by Alvey-Ferguson handles miscellaneous small parts in bulk form after plating.



A 24 in. diameter drum is gas heated. Recirculated hot air is provided.

For further information, *write* Alvey-Ferguson Co., 3131 Disney St., Cincinnati 9, Ohio.

Self-Adhering Teflon Tape Resists up to 400° F

CONTINUOUS use at 350° F and short time use up to 400° F are claimed for a pressure sensitive Teflon tape. It's designated Type IT and consists of a laminate of Dilectrix Type S Teflon film bonded to a high tack adhesive layer.

Because Type IT is not chemically etched, the company says that electrical, chemical, and mechanical characteristics of Teflon are maintained. The tape will adhere to glass, metals, wood, ceramics, and other surfaces.

The nonstick outer surface and chemical inertness make the material suitable for chute linings, conveyor belt surfaces, table coverings, and other facings. Other suggested uses: Gasket facings and cap liners for corrosive chemical confinement. Widths range from 1/4 to 12 in. in increments of 1/8 in.

For further information, *write* Dilectrix Corp., Allen Boulevard & Grand Avenue, Farmingdale, N. Y.

Lubricant Additive Safe For Aluminum Wrapping

BY PREVENTING lubricant breakdown, Nopco 9390 additive permits continuous rolling of aluminum foil and sheets to consistent gage or thickness, and to a uniform, fine surface finish, says Nopco Chemical Co. The company says the product is also useful in drawing, extruding, stamping, and machining of aluminum.

The ingredients of the additive comply with the requirements of the U. S. Food & Drug Administration.

Nopco 9390 is generally recognized as safe for use in food wrappings, says the company.

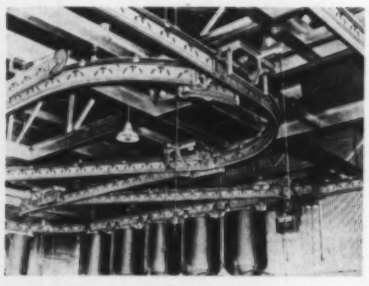
For further information, *write* Metal Processing Dept., Industrial Div., Nopco Chemical Co., 60 Park Place, Newark, N. J.

Track Takes Heavy Loads

A HEAVY DUTY track for overhead material handling service is a compound section consisting of a steel flange and web and a specially rolled, high carbon, alloy steel rail.

The company says the parts are welded continuously from end to end under carefully controlled conditions to form a combined section free of stress concentrations.

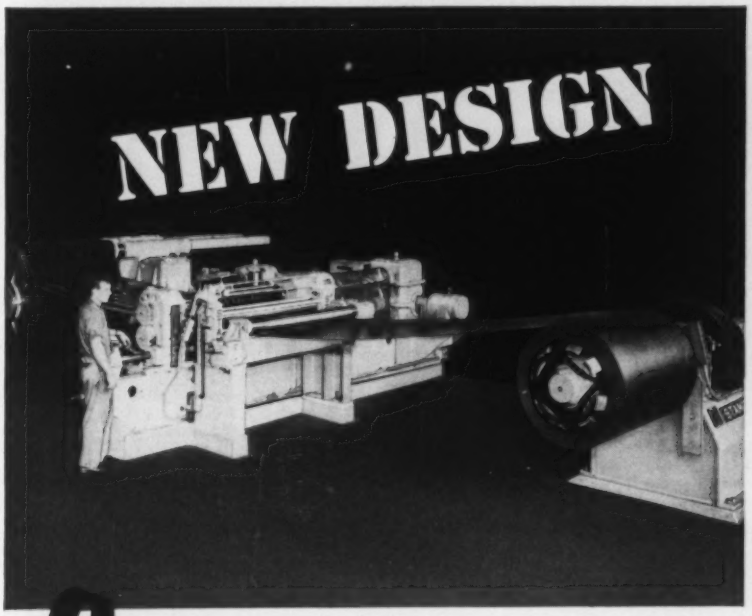
The high strength rail has a hard, flat, raised thread or running surface. The tread is smooth and becomes highly polished in service. No peening down occurs. A ball and socket swivel connection forms a flexible suspension system for the track. Called Tarca, the track is made in a large number of standard sizes ranging from 8 to 20 in. deep. Special sizes and greater depth tracks can be furnished. The dimensions match existing Cleveland Tramrail track dimensions (permitting extension of all systems now in service).



The manufacturer says Tarca track is especially suitable where distances between track supports are great. For most situations with such limitations, the track reduces or eliminates the need of a specially engineered structural framework. For example, when the track is used on crane bridges, single girder, 3 ton cranes, or double girder, 5 ton cranes can be made for operation on runways with tracks spaced up to 100 ft centers.

Standard deflection is said not to exceed 1/450th of the span. For applications with spans about 50 to 60 ft between supports, a ratio of 1/600th is normally used. The tracks can be used for hand power or electrified switches. Systems can be developed for nearly every handling situation requiring straight or curved tracks for loads up to 20 tons. Standard tracks are available in lengths to 60 ft.

For further information, *write* Cleveland Tramrail Div., Cleveland Crane & Engineering Co., Wickliffe, Ohio.



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District Offices, Stamco Sales, Inc.
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R. P. Popp, 101 Investment Building, Pittsburgh 22, Pa.
I. W. Spraitzar, 159 Main Street, Chatham, New Jersey
W. E. Heineman, 122 West Burlington Ave., LaGrange, Illinois
W. H. Millan, 11955 Shaker Boulevard, Cleveland 20, Ohio

NEW Literature

Write directly to the company for a copy

Hydrogen Generation

How metallic hydrides can be used for generation of hydrogen through interaction with water is explained in Technical Bulletin No. 511. Metal Hydrides Inc., 12-24 Congress St., Beverly, Mass.

High Temperature Alloys

Literature published by Allegheny Ludlum presents information on high temperature, high strength alloys. A leaflet is provided on each of a series of steels and alloys. A 28-page general booklet covers high temperature alloys. Advertising Dept. Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa.

Aluminum Oxide Removal

Chemical removal of high resistance oxide films from aluminum is discussed in an eight page booklet. It probes the variables of resistance welding and points out that uniformity of resistance is more important than resistance limits. Also presented are outlines for several specific weld preparation procedures and suggestions for getting the best welding results. Oakite Products Inc., 134E Rector St., New York 6, N. Y.

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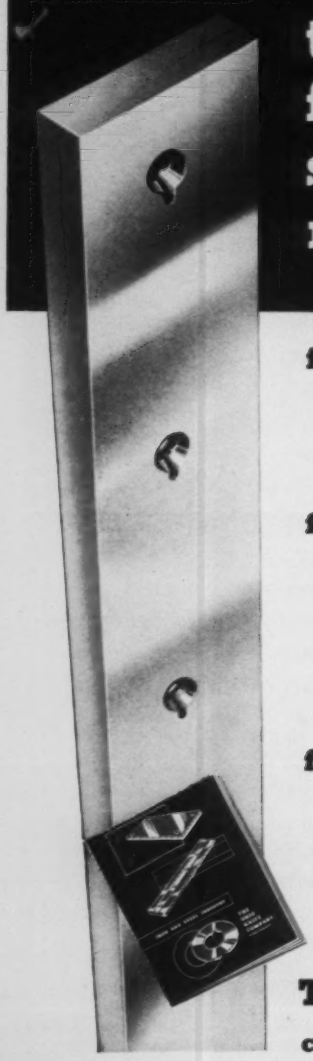

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CINCINNATI 23, OHIO

Acidproof Cements

A bulletin contains a list of more than 75 corrosive solutions and a rating for the various types of acidproof cements at temperatures of 75 and 140° F. Acid-Proof Cement Manufacturers Association, 1015 Chestnut St., Philadelphia 7, Pa.

Properties of Plastics

Properties of eight plastics are discussed and compared in a four page brochure, illustrated with 12 bar graphs. The plastics mentioned include Delrin, polycarbonate, polypropylene, high density polyethylene, and Nylon 6. Cadillac Plastic & Chemical Co., 15111 Second Ave., Detroit 3, Mich.

Rust Control

The control of rust during production operations is discussed in an eight page guide. It details causes of rust, factors vital to successful rust control, specialized rust prevention products, and gives tips on selection. Magnus Chemical Co. Inc., M-88-35 South Ave., Garwood, N. J.

Security Services

A handbook published by Pinkerton's National Detective Agency reviews professional services that security agencies can handle. The booklet contains 13 case histories. Pinkerton's National Detective Agency Inc., 100 Church St., New York 7, N. Y.

Hot Dip Galvanizing

Corrosion Resistance of Hot Galvanizing is the first in a series of technical booklets on the subject and is intended to give engineers, architects, and designers up to date and accurate information on the performance of hot galvanized coatings in various environments. The advantage of using heavy coatings to obtain more complete protection against rust is stressed. Hot Dip Galvanizers Association, 34 Berkeley Square, London W. 1, England.

Neutrons from Tubes

A folder, "Neutrons from Small Tubes" discusses tubes which provide neutrons in quantities intermediate to those available from isotopic sources and reactors. Philips Electronic Instruments Div., Philips Electronics & Pharmaceutical Industries Corp., 750 S. Fulton Ave., Mt. Vernon, N. Y.

Resistance Alloy

Properties and performance characteristics of Hoskins Alloy 750 are presented in a technical bulletin. The bulletin also contains helpful information and recommendations for designing, fabricating, and welding coiled heating elements made of the material. Hoskins Mfg. Co., 4445 Lawton Ave., Detroit 8, Mich.

Flexible Pipe Guide

Included in a flexible pipe connector guide (Manual AM-9) are sections discussing proper installation. A checklist is provided to help in designing for optimum service life. Allied Metal Hose Co., 3746 Ninth St., Long Island City 1, N. Y.

Look for Upturn in Shipments

LOOK FOR August steel shipments to top July's in spite of delivery postponements some automakers have been requesting. There's enough new strength in other markets to make up for the deferred automotive business.

Nevertheless, steelmakers are disappointed. Says a major producer: "Until ten days ago, we thought our August bookings might be the best of any month this year—thanks to some big orders from the auto companies. Then deferments rolled in, and the bottom fell out. We still expect to ship more steel this month than we did in July, but we've given up hope of beating June's figures."

AUTOMAKERS CAUTIOUS— In Detroit, the attitude seems to be one of watchful waiting. Automakers have enough steel on hand or in transit for August—industry output is expected to be only 180,000 cars vs. 400,000 in July—and they don't want to release more orders until they can be sure there won't be a strike. But even if they avert a walkout, they don't expect to get into full production of new models as quickly as they originally estimated. Result: They're asking steelmakers to hold back some August tonnage until September.

GRADUAL UPTREND— Until automotive demand picks up, steelmakers expect only a gradual uptrend in their operations. Their August production will be no more than 8.3 million ingot tons vs. 8.1 million in July. As long as steelmakers can give fast deliveries, customers have no incentive to order ahead or build inventories. There's no evidence that buyers are hedging against the possibility of an October price hike.

SIGNS OF STRENGTH— Although the next few weeks won't bring much improvement in steel demand, the outlook for the fall is promising. Optimists note: 1. New car sales in the middle third of July were the highest for that period since 1955. If sales continue at that pace, dealers won't have trouble with the 1961 model cleanup. 2. Factory sales of home laundry appliances in June were 7 per cent higher than those of June, 1960. 3. Foreign orders for machine tools in June hit their highest point since early 1951. 4. Construction contracts awarded in June were 4 per cent above those in June, 1960. Total awards for the first six months of 1961 were $18.2 billion vs. $17.6 billion in the like period of 1960.

PRICE HIKE PREDICTED— As the time draws near for steelmakers to give union members another wage hike, more buyers are betting that steel prices will be raised simultaneously.

In its July report, the National Association of Purchasing Agents said members expressed "apprehension over price policies of venders who have experienced wage and raw material cost increases and have not yet passed them on in the form of higher prices."

At a Chicago press conference, members of the executive committee of the Steel Service Center Institute said they expect steel prices to be raised selectively in the fall.

In speaking about the need for higher prices, Arthur B. Homer, chairman, Bethlehem Steel Corp., declared that if conditions in the fall point to an increase he would not be deterred by "feelings expressed in Washington."

PRODUCTION INCHES UP— Look for ingot production in the week ending Aug. 12 to be slightly higher than the 1,790,000 tons that STEEL estimates the industry poured in the week ended Aug. 5. Output then was 1.5 per cent below the previous week's.

WHERE TO FIND MARKETS & PRICES

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*Current prices were published in the July 31 issue and will appear in subsequent issues.

STEEL
QUARTERLY SURVEY

MILL PRODUCTS	CURRENT INVENTORIES					4th Quarter FORECAST		
	UNDER 10 DAYS	10-30 DAYS	30-60 DAYS	60-90 DAYS	3-6 MONTHS	LOWER	SAME	HIGHER
HOT-ROLLED CARBON BARS	10%	26%	49%	14%	1%	11%	74%	15%
COLD-FINISHED BARS	10%	28%	46%	15%	1%	6%	85%	9%
H & C-R SHEETS, STRIP	14%	14%	52%	14%	6%	12%	76%	12%
LIGHT PLATES	6%	19%	50%	22%	3%	23%	66%	11%
HEAVY PLATES	6%	21%	44%	23%	6%	18%	70%	12%
STRUCTURAL SHAPES	9%	15%	56%	20%	—	13%	78%	9%
COPPER & BRASS	15%	18%	41%	26%	—	9%	80%	11%
ALUMINUM	12%	9%	46%	21%	12%	19%	62%	19%

FIGURES are percentages of respondents to STEEL's quarterly survey. UNDERSCORED figures show how most respondents reported.

Buyers Oppose Inventory Buildup

Three-fourths of respondents to STEEL poll plan to maintain stocks at present levels. But delivery complaints and longer leadtimes are beginning to show up again

NO BUILDUP of ferrous and nonferrous mill products stocks has accompanied the economic upswing and none is in sight this year.

"We'll maintain inventories at the present level," say 75 per cent of the respondents to STEEL's quarterly survey of metals buyers.

That is the most solid support given the status quo in more than three years.

Although inventory reductions have tapered off, buyers are not yet ready to start buying for stockpiling. The 12 per cent who plan to add to their stocks may just offset reductions still planned by 13 per cent of the buyers. Overstocks of various items are reported by 19 per cent of the respondents, the highest percentage since last November.

• **Delivery Problems** — Complaints about deliveries (5 per cent) are more numerous than they have been since May, 1960. One West Coast purchasing agent observes, "Some promises are proving unreliable and longer leadtimes are required." If delivery problems become more widespread, buyers who are not planning to raise their inventory levels may get caught short. And the situation could be complicated overnight if steel and aluminum price hikes appear more likely later this summer.

• **Stock Trimming**—In the last three months, 68 per cent of the buyers held their inventories steady, 24 per cent made reductions, and only 8 per cent made additions.

Heaviest reductions were in supplies of hot and cold rolled sheets and strip and structural shapes. There still are more buyers who plan reductions than those who will build stocks of those items, but the margin has narrowed considerably.

The only buildup was registered in cold finished bars, but 85 per cent of the buyers favor keeping those stocks at the present level.

• **Current Picture**—The breakdown of general inventory: Under 10 days, 11 per cent; 10 to 30 days, 20 per cent; 30 to 60 days, 47 per cent; 60 to 90 days, 19 per cent; three to six months, 3 per cent.

Since STEEL's last survey (May 1, p. 82) there has been a slight shift in the 30 to 90 day levels. A reduced number of companies are in the 10 to 30 day and three to six month brackets. Those with less than 10 days' supply remained the same.

Allegheny Ludlum Raises Stainless Strip Capacity

Allegheny Ludlum Steel Corp. is increasing its capacity to produce bright annealed, stainless steel strip with the addition of a second, vertical, continuous annealing furnace at its West Leechburg (Pa.) Works. The furnace is scheduled for operation during the fourth quarter and will produce strip up to 27 in. wide and in gages somewhat heavier than can be turned out with earlier furnaces.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 105 & 106

Cold rolled sheet buying is edging upward. Demand for galvanized sheets is still active, and some improvement in specialties, such as electrical sheets and enameling stock, is noted.

Order leadtime on flat rolled products, except galvanized sheets, remains at the minimum. Not much change is likely until September.

Hot rolled sheets are quoted for delivery in two to three weeks; cold rolled sheets, two to five weeks. Promises on galvanized sheets continue to be well extended; some producers have little to offer before mid-October.

Demand from farm equipment makers is somewhat weaker than it was—due partly to seasonal influences and partly to slower buying by farmers because of the drought in the western plains.

Consumers in New England show little interest in fourth quarter requirements. There is agreement that needs for the fourth quarter will be heavier, but prompt deliveries on most grades are still working against forward buying.

Steel Service Center Executives Forecast Continued Sales Gains

STEEL SERVICE centers look for a mild improvement this month, but anticipate no real spurt until after Labor Day. Sheets and light structurals are moving best at this time.

At a meeting of its executive committee in Chicago, July 28, the Steel Service Center Institute reported that despite an increase in plant-wide vacation shutdowns in some major industrial areas in July, shipments by distributors declined less in July from June than industry leaders had anticipated.

• **Demand Improves** — Robert G. Welch, executive vice president, said: "Apparently the improved business is coming from all segments of the economy. If it continues, the industry's volume may be considerably better in the third and fourth quarters than the improvement we now anticipate for the current half year."

While July business was about 12 per cent below that in June, that was largely accounted for by fewer shipping days in July (19 against 22 in June). The volume for July was ahead of the same month of 1960. On a day-to-day basis, the industry's July shipments ran even with June's.

Shipments by steel service centers have shown modest increases each month during 1961, although at the end of the first half they were 15 per cent below the figure for the first half of 1960, largely because of the abnormally high rate of activity in early 1960 following settlement of the steel strike. During that period, inventories were expanded to levels far beyond normal.

President R. J. Heggie, A. M. Castle & Co., said he anticipates third quarter volume this year will be slightly ahead of that for the preceding period, with the fourth quarter exceeding both second and third quarters.

• **Forecasts**—Consensus of members of the industry is that their sales in the second half of 1961 will be 15 per cent higher than in the second half of 1960. Result: The 1961 total is expected to equal or slightly exceed shipments for the previous year.

Some industry leaders are more optimistic. They predict an increase in shipments for the entire year of 10 to 12 per cent. They back up this optimism by citing four major factors: 1. The greater emphasis on conventional weapons which contain substantial quantities of steel. 2. Potential business in the machine tool and heavy equipment industries where purchases are being delayed pending announcement of possible depreciation reforms. 3. Hedge buying in anticipation of a possible price increase. 4. The likelihood of a build-up of inventories by metal fabricating plants.

• **Stocks Gain**—Inventories of industrial steel products in service centers, amounting to 2.8 million tons last March, have moved up about 50,000 tons each month since then to the 3 million ton level on June 30. They remained at the latter figure during July. Industry leaders expect a modest inventory buildup in the third quarter.

• **Price Outlook**—Several steel service center institute directors think there will be selective increases in steel prices as mills meet the Oct. 1 wage hike. They see little alternative as mills become faced with higher costs. It was pointed out that structurals likely would be one of the first products to be boosted because they are not lucrative at present. There was also agreement that as steel prices are increased, service centers will pass the increases along to their customers.

Regarding price advances, some observers of the steel industry feel that the present world tensions may bolster administration hopes for holding the price line.

Distributors . . .

Prices, Page 109

American Steel Warehouse Co. is constructing office facilities adjacent to the Portland, Oreg., warehouse

(*Please turn to Page* 102)

FOR THE MACHINERY PART

THAT TAKES THE BEATING

HAYNES Alloys *will do the job!*

Perfect performance for 100,000 hours at orange heat, in the combustion chambers of diesel engines, is quite an achievement. Yet it's the record of tens of thousands of special combustion cups of HASTELLOY alloy C in a well-known line of diesels.

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These and other special properties are built into HAYNES alloys —to fit the particular needs of design and production engineers for machinery parts that must meet the roughest service conditions.

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HAYNES STELLITE COMPANY
Division of Union Carbide Corporation
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Address inquiries to Haynes Stellite Company, 270 Park Avenue, New York 17, N. Y.

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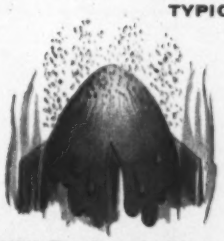
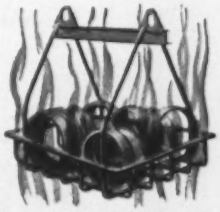
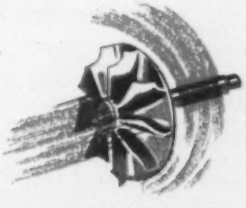
TYPICAL "HAYNES" ALLOY PARTS THAT RESIST...



ABRASION. Ten times the life and still no sign of wear, is the record of this plastics-extrusion torpedo nose made of HAYNES STELLITE alloy No. 3. This is one of many HAYNES wear-resistant alloys.



CORROSION. Baskets made of HASTELLOY alloy C used for holding forgings during acid treatment, are still good after 15 months of service. Materials formerly used were replaced every month.



HIGH TEMPERATURE. Turbine wheels in the "hot" ends of diesel engine turbochargers are investment-cast of HAYNES STELLITE alloy No. 31, for service at speeds up to 50,000 rpm. at 1500 deg. F.

(Concluded from Page 99)

which the company purchased in 1953 in anticipation of expansion. Cost: $200,000.

Upon completion of the offices in December, American Steel will have 140,000 sq ft of warehouse and office space compared with its present area of 50,000 sq ft. The facility will become the central branch and depot for the company's three southern branches: American Steel & Supply, Eugene and Medford, Oreg., and Coast Steel & Supply, Redding, Calif.

Upon moving to the new location, the company will expand its product lines and will add new lines of steel and mill supplies. It will install more than $100,000 worth of steel handling equipment.

Ferroalloys . . .

Ferroalloy Prices, Page 111

Koppers International C. A., a subsidiary of Koppers Co. Inc., Pittsburgh, has received a contract from Acoje Mining Co., Manila, Philippines, for a ferrochrome plant to be built near Iligan on the island of Mindanao.

The plant will utilize the Strategic-Udy direct reduction process, under license from Strategic Patents Ltd., a subsidiary of Strategic Materials Corp., New York. Production of ferrochrome should commence about 15 months after construction of the plant begins.

Steelmaking Operations Decline

Steel ingot production is the lowest it has been since the week ended June 22, excepting the July 4 holiday week. Production for the week ended Aug. 5 is estimated by STEEL at 1,790,000 tons, a decline of 1.5 per cent from the preceding week's 1,818,000 tons.

Despite the recent downtrend in output, most producers anticipate better business in August than they had in July and more improvement in September. The Commerce Department predicts the steel industry's fourth quarter will be the best since the first quarter of 1960 when production zoomed following the steel strike.

The rate of improvement will hinge mainly on automotive requirements, which in turn will depend on the outcome of labor negotiations in the auto industry. If a strike is avoided, automotive tonnage will run heavy and will have a stimulating effect on other consuming lines. But a sharp, over-all boom is not expected.

Improvement will be aided by good construction activity, a pickup in capital goods spending, and a betterment in appliance demand. The President's defense buildup may also have some influence—but probably not much before next year.

● **Youngstown**—Steelmaking operations here fell 1 point during the week ended Aug. 5 to 51 per cent of 1960 capacity. Republic Steel Corp. took off one open hearth at its Youngstown Works. Some plants are making up orders that aren't for shipment until late August in an effort to keep units going without temporary cutbacks until demand improves.

● **Buffalo**—After a long stalemate, steel production here moved ahead a notch during the week ended Aug. 5. An idle open hearth was reactivated at Bethlehem Steel's mill, raising the district's rate to about 46.5 per cent of 1960 capacity. It marks the first upturn in district operations in a long time, and steel mill executives hope it heralds the beginning of an upswing.

The national defense program appears to have had little effect on the buying policies of purchasing agents for metalworking companies.

● **Birmingham** — The steelmaking rate in the Birmingham-Gadsden-Atlanta district for the week ended Aug. 5 rose 3 points to about 67 per cent of 1960 capacity.

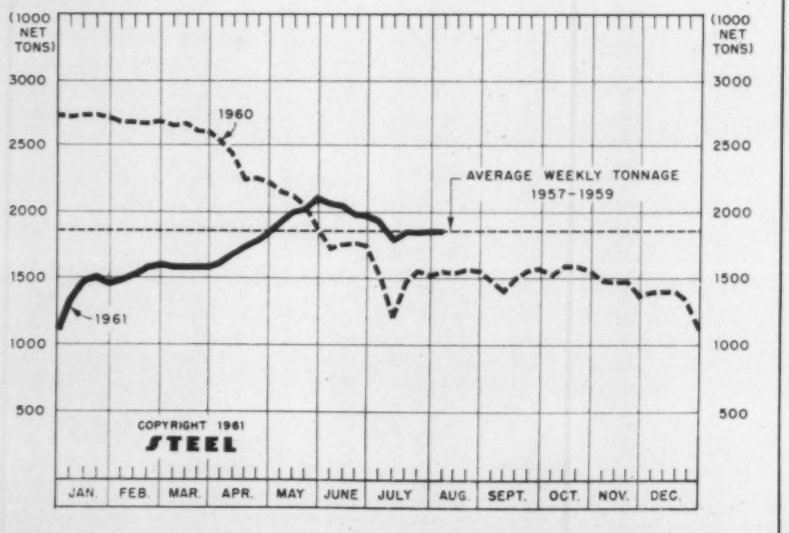
● **Chicago**—Operations for the week ended Aug. 5 declined 2 points to 70 per cent of 1960 capacity. Steel buying is quiet on all consuming fronts. Chiefly responsible is the lack of ordering by automakers. Not much change is expected for two or three weeks.

STEEL INGOT PRODUCTION

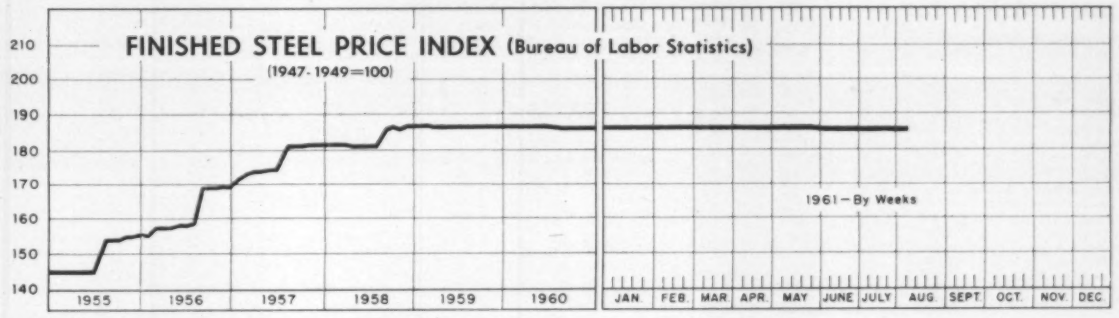
Weeks Ended	Net Tons	Change
Aug. 5	1,790,000*	— 1.5%
July 29	1,818,000	— 2.2%
July 22	1,858,000	— 0.1%
Totals to July 29		
1961	52,386,000	—20.8%
1960	66,135,000	

DISTRICTS	Week Ended —July 29— Tons‡	Index†	Week Ended July 22 Index†
Northeastern	264,524	99	96
Buffalo	76,910	79	84
Pittsburgh	355,123	88	88
Youngstown	147,883	87	89
Cleveland	91,669	99	102
Detroit	100,720	96	117
Chicago	392,780	105	107
Cincinnati	87,470	116	117
St. Louis	57,805	110	107
Southern	113,816	105	103
Western	130,943	112	117
Industry	1,818,000	97.6	99.7

*Estimated by STEEL.
†1957-59 (1,862,933 tons) = 100.
‡District tonnages are approximate and will not necessarily add to the national total.



Price Indexes and Composites



Aug. 1, 1961	Week Ago	Month Ago	July Index	Year Ago
185.6	185.6	185.6	185.5	186.2

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Aug. 1

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825
Rails, Light, 40 lb	7.292
Tie Plates	6.875
Axles, Railway	10.175
Wheels, Freight Car, 33 in. (per wheel)	62.000
Plates, Carbon	6.350
Structural Shapes	6.167
Bars, Tool Steel, Carbon (lb)	0.560
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400
Bars, Tool Steel, H.R. Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895
Bars, H.R., Alloy	10.775
Bars, H.R., Stainless, 303 (lb)	0.543
Bars, H.R., Carbon	6.675
Bars, Reinforcing	(N.A.)
Bars, C.F., Carbon	10.710
Bars, C.F., Alloy	14.125
Bars, C.F., Stainless, 302 (lb)	0.570
Sheets, H.R., Carbon	6.350
Sheets, C.R., Carbon	7.300
Sheets, Galvanized	8.775
Sheets, C.R., Stainless, 302 (lb)	0.643
Sheets, Electrical	12.625
Strip, C.R., Carbon	9.225
Strip, C.R., Stainless, 430 (lb)	0.460
Strip, H.R., Carbon	6.250
Pipe, Black, Buttweld (100 ft)	19.495
Pipe, Galv., Buttweld (100 ft)	23.098
Pipe Line (100 ft)	195.430
Casing, Oil Well, Carbon (100 ft)	193.030
Casing, Oil Well, Alloy (100 ft)	302.600
Tubes, Boiler (100 ft)	51.200
Tubing, Mechanical, Carbon (100 ft)	27.005
Tubing, Mechanical, Stainless, 304 (100 ft)	194.268
Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
Black Plate, Canmaking Quality (95 lb base box)	7.900
Wire, Drawn, Carbon	10.575
Wire, Drawn, Stainless, 430 (lb)	0.665
Bale Ties (Bundles)	7.647
Nails, Wire, 8d Common	9.433
Wire, Barbed (80-rod spool)	8.372
Woven Wire Fence (20-rod roll)	20.910

STEEL's FINISHED STEEL PRICE INDEX

	Aug. 2 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg = 100)	247.82	247.82	247.82	247.82	210.45
Index in cents per lb	6.713	6.713	6.713	6.713	5.701

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$131.27
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	61.09
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	60.11
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	61.63
Steelmaking Scrap, GT	37.83	37.00	36.67	32.00	53.17

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Aug. 2 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.65
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.65
Bars, H.R., deld., Philadelphia	5.98	5.98	5.98	5.975	4.93
Bars, C.R., Pittsburgh	7.65	7.65	7.65	7.65	6.25
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.60
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.60
Shapes, deld., Philadelphia	5.745	5.745	5.745	5.77	5.00
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.50
Plates, Chicago	5.30	5.30	5.30	5.30	4.50
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.80
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.50
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	5.35
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.325-5.425
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.85
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	6.25
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	6.25-6.35
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	6.35
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	6.60
Nails, Wire, nonstock, Pitts.	8.95	8.95	8.95	8.95	7.60
Tin Plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.85

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$84.50
Wire rods, 7/32-9/32" Pitts.	6.40	6.40	6.40	6.40	5.375

PIG IRON, Gross Ton	Aug. 2 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$62.25
Basic, Valley	66.00	66.00	66.00	66.00	60.00
Basic, deld., Philadelphia	70.18	70.18	70.18	70.41	66.26
No. 2 Fdry, NevilleIsland, Pa.	66.50	66.50	66.50	66.50	63.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	63.00
No. 2 Fdry, deld., Phila.	70.68	70.68	70.68	70.91	66.76
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	57.00
No. 2 Fdry (Birm.), deld., Cin.	70.20	70.20	70.20	70.20	62.70
Malleable, Valley	66.50	66.50	66.50	66.50	60.50
Malleable, Chicago	66.50	66.50	66.50	66.50	63.00
Ferromanganese, net ton†	245.00	245.00	245.00	245.00	215.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$35.50	$35.50	$35.50	$30.50	$55.50
No. 1 Heavy Melt, E. Pa.	40.00	39.00	39.00	34.00	54.00
No. 1 Heavy Melt, Chicago	38.00	36.50	35.50	31.50	50.00
No. 1 Heavy Melt, Valley	38.50	38.50	38.50	33.50	59.50
No. 1 Heavy Melt, Cleve.	35.50	35.50	35.50	31.50	56.50
No. 1 Heavy Melt, Buffalo	31.50	31.50	31.50	29.50	44.50
Rails, Rerolling, Chicago	58.50	58.50	58.50	52.50	73.50
No. 1 Cast, Chicago	42.50	41.50	41.50	42.50	49.50

COKE, Net Ton					
Beehive, Furn., Connisvl.	$15.00	$15.00	$15.00	$15.00	$14.125
Beehive, Fdry., Connisvl.	18.25	18.25	18.25	18.25	16.50
Oven, Fdry., Milwaukee	32.00	32.00	32.00	32.00	27.50

Steel Prices

Mill prices as reported to STEEL, Aug. 2, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 105; footnotes, page 107.

SEMIFINISHED

INGOTS, Carbon Forging (NT)
Munhall,Pa. U5 .....$76.00

INGOT, Alloy (NT)
Detroit S41 .....$82.00
Economy,Pa. B14 .....82.00
Farrell,Pa. S3 .....82.00
Lowellville,O. S3 .....82.00
Midland,Pa. C18 .....82.00
Munhall,Pa. U5 .....82.00
Sharon,Pa. S3 .....82.00

BILLETS, BLOOMS & SLABS Carbon Rolling (NT)
Bartonville,Ill. K4 ....$82.00
Bessemer,Pa. U5 .....80.00
Buffalo R2 .....80.00
Clairton,Pa. U5 .....80.00
Ensley,Ala. T2 .....80.00
Fairfield,Ala. T2 .....80.00
Fontana,Calif. K1 .....90.50
Gary,Ind. U5 .....80.00
Johnstown,Pa. B2 .....80.00
Lackawanna,N.Y. B2 ..80.00
Munhall,Pa. U5 .....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5 ..80.00
S.Duquesne,Pa. U5 ....80.00
Sterling,Ill. N15 .....80.00
Youngstown R2 .....80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 .....$99.50
Buffalo R2 .....99.50
Canton,O. R2 .....102.00
Clairton,Pa. U5 .....99.50
Conshohocken,Pa. A3 ..99.50
Ensley,Ala. T2 .....99.50
Fairfield,Ala. T2 .....99.50
Farrell,Pa. S3 .....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 .....99.50
Geneva,Utah C11 .....99.50
Houston S5 .....104.50
Johnstown,Pa. B2 .....99.50
Lackawanna,N.Y. B2 ..99.50
LosAngeles B3 .....109.00
Midland,Pa. C18 .....99.50
Munhall,Pa. U5 .....99.50
Owensboro,Ky. C8 .....99.50
Seattle B3 .....109.00
Sharon,Pa. S3 .....99.50
S.Chicago R2, U5, W14..99.50
S.Duquesne,Pa. U5 ....99.50
S.San Francisco B3 ...109.00
Warren,O. C17 .....99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ...$119.00
Bridgeport,Conn. C32..119.00
Buffalo R2 .....119.00
Canton,O. R2, T7 ....119.00
Conshohocken,Pa. A3..121.00
Detroit S41 .....119.00
Economy,Pa. B14 .....119.00
Farrell,Pa. S3 .....119.00
Fontana,Calif. K1 ....140.00
Gary,Ind. U5 .....119.00
Houston S5 .....124.00
Ind.Harbor,Ind. Y1 ..119.00
Johnstown,Pa. B2 .....119.00
Lackawanna,N.Y. B2..119.00
LosAngeles B3 .....139.00
Lowellville,O. S3 .....119.00
Massillon,O. R2 .....119.00
Midland,Pa. C18 .....119.00
Munhall,Pa. U5 .....119.00
Owensboro,Ky. G8 ....119.00
Seattle(6) B3 .....140.00
Sharon,Pa. S3 .....119.00
S.Chicago R2,U5,W14 .119.00
S.Duquesne,Pa. U5 ..119.00
Struthers,O. Y1 .....119.00
Warren,O. C17 .....119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 .....$122.50
Canton,O. R2 .....125.00
Cleveland R2 .....122.50
Gary,Ind. U5 .....122.50
S.Chicago,Ill. R2,W14 .122.50
S.Duquesne,Pa. U5 ...122.50
Warren,O. C17 .....122.50

SKELP
Aliquippa,Pa. J5 .....5.05
Benwood,W.Va. W10 ....5.05
Ind.Harbor,Ind. Y1 ....5.05
Munhall,Pa. P5 .....5.05
Pittsburgh J5 .....5.05
Warren,O. R2 .....5.05
Youngstown R2, U5 ....5.05

WIRE RODS
AlabamaCity,Ala. R2 ...6.40
Aliquippa,Pa. J5 .....6.40
Alton,Ill. L1 .....6.60
Bartonville,Ill. K4 .....6.50
Buffalo W12 .....6.40
Cleveland A7 .....6.40
Donora,Pa. A7 .....6.40
Fairfield,Ala. T2 .....6.40
Houston S5 .....6.65
IndianaHarbor,Ind. Y1 ..6.40
Johnstown,Pa. B2 .....6.40
Joliet,Ill. A7 .....6.40
KansasCity,Mo. S5 .....6.65
Kokomo,Ind. C16 .....6.50
LosAngeles B3.....7.20
Minnequa,Colo. C10 .....6.65
Monessen,Pa. P7 .....6.40
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 .....6.40
Roebling,N.J. R5 .....6.50
S.Chicago,Ill. R2, W14..6.40
SparrowsPoint,Md. B2..6.50
Sterling,Ill.(1) N15 .....6.40
Sterling,Ill. N15 .....6.50
Struthers,O. Y1 .....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2....5.50
Aliquippa,Pa. J5 .....5.50
Atlanta A11 .....5.70
Bessemer,Ala. T2 .....5.50
Bethlehem,Pa. B2 .....5.55
Birmingham C15 .....5.50
Clairton,Pa. U5 .....5.50
Fairfield,Ala. T2 .....5.50
Fontana,Calif. K1 .....6.30
Gary,Ind. U5 .....5.50
Geneva,Utah C11 .....5.50
Houston S5 .....5.60
Ind.Harbor,Ind. I-2, Y1.5.50
Johnstown,Pa. B2 .....5.55
Joliet,Ill. P22 .....5.50
KansasCity,Mo. S5 .....5.60
Lackawanna,N.Y. B2 ...5.55
LosAngeles B3 .....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 .....5.50
Niles,Calif. P1 .....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 .....6.25
Seattle B3 .....6.25
S.Chicago,Ill. U5, W14..5.50
S.SanFrancisco B3 .....6.15
Sterling,Ill. N15 .....5.50
Struthers,O. Y1 .....5.50
Torrance,Calif. C11 ....6.20
Weirton,W. Va. W6 ....5.50

Wide Flange
Bethlehem,Pa. B2 .....5.55
Clairton,Pa. U5 .....5.50
Fontana,Calif. K1 .....6.45
IndianaHarbor,Ind. I-2..5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 .....5.50
Phoenixville,Pa. P4 .....5.55
S.Chicago,Ill. U5 .....5.50
Sterling,Ill. N5 .....5.50
Weirton,W.Va. W6 .....5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....6.90
Munhall,Pa. U5 .....6.80
S.Chicago,Ill. U5, W14 ..6.80

H.S., L.A., Std. Shapes
Aliquippa,Pa. J5 .....8.05
Bessemer,Ala. T2 .....8.05
Bethlehem,Pa. B2 .....8.10
Clairton,Pa. U5 .....8.05
Fairfield,Ala. T2 .....8.05
Fontana,Calif. K1 .....8.85
Gary,Ind. U5 .....8.05
Geneva,Utah C11 .....8.05
Houston S5 .....8.15
Ind.Harbor,Ind. I-2, Y1 .8.05
Johnstown,Pa. B2 .....8.10
KansasCity,Mo. S5 .....8.15
Lackawanna,N.Y. B2 ...8.10
LosAngeles B3 .....8.75
Munhall,Pa. U5 .....8.05
Phoenixville,Pa. P4 ....8.10
Seattle B3 .....8.80
S.Chicago,Ill. U5, W14 ..8.05
S.SanFrancisco B3 .....8.70
Sterling,Ill. N15 .....7.75
Struthers,O. Y1 .....8.05

H.S., L.A., Wide Flange
Bethlehem,Pa. B2 .....8.10
Ind.Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ...8.10
Munhall,Pa. U5 .....8.05
S.Chicago,Ill. U5 .....8.05
Sterling,Ill. N15 .....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 .....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ...5.55
Munhall,Pa. U5 .....5.50
S.Chicago,Ill. I-2, U5 ...5.50

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 .....6.50
Lackawanna,N.Y. B2 ..6.50
Munhall,Pa. U5 .....6.50
S.Chicago,Ill. I-2, U5 ...6.50
Weirton,W.Va. W6 .....6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ...5.30
Aliquippa,Pa. J5 .....5.30
Ashland,Ky.(15) A10 ...5.30
Bessemer,Ala. T2 .....5.30
Clairton,Pa. U5 .....5.30
Claymont,Del. P4 .....5.30
Cleveland J5, R2 .....5.30
Coatesville,Pa. L7 .....5.30
Conshohocken,Pa. A3 ...5.30
Ecorse,Mich. G5 .....5.30
Fairfield,Ala. T2 .....5.30
Farrell,Pa. S3 .....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 .....5.30
Geneva,Utah C11 .....5.30
GraniteCity,Ill. G4 .....5.40
Houston S5 .....5.40
Ind.Harbor,Ind. I-2, Y1.5.30
Johnstown,Pa. B2 .....5.30
Lackawanna,N.Y. B2 ...5.30
Mansfield,O. E6 .....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 .....5.30
Newport,Ky. A2 .....5.30
Pittsburgh J5 .....5.30
Riverdale,Ill. A1 .....5.30
Seattle B2 .....6.20
Sharon,Pa., S3 .....5.30
S.Chicago,Ill. U5, W14..5.30
SparrowsPoint,Md. B2 ..5.30
Sterling,Ill. N15 .....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 .....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 ....5.30

PLATES, Carbon Abras. Resist.
Claymont,Del. P4 .....7.05
Fontana,Calif. K1 .....7.85
Geneva,Utah C11 .....7.05
Houston S5 .....7.15
Johnstown,Pa. B2 .....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron
Economy,Pa. B14 .....14.10

PLATES, H.S., L.A.
Aliquippa,Pa. J5 .....7.95
Ashland,Ky. A10 .....7.95
Bessemer,Ala. T2 .....7.95
Clairton,Pa. U5 .....7.95
Claymont,Del. P4 .....7.95
Cleveland J5, R2 .....7.95
Coatesville,Pa. L7 .....7.95
Conshohocken,Pa. A3 ...7.95
Economy,Pa. B14 .....7.95
Ecorse,Mich. G5 .....7.95
Fairfield,Ala. T2 .....7.95
Farrell,Pa. S3 .....7.95
Fontana,Calif.(30) K1 ..8.75
Gary,Ind. U5 .....7.95
Geneva,Utah C11 .....7.95
Houston S5 .....8.05
Ind.Harbor,Ind. I-2, Y1..7.95
Johnstown,Pa. B2 .....7.95
Munhall,Pa. U5 .....7.95
Pittsburgh J5 .....7.95
Seattle B3 .....8.85
Sharon,Pa. S3 .....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2 ..7.95
Sterling,Ill. N15 .....7.625
Warren,O. R2 .....7.95
Youngstown U5, Y1 ....7.95

PLATES, Alloy
Aliquippa,Pa. J5 .....7.50
Claymont,Del. P4 .....7.50
Coatesville,Pa. L7 .....7.50
Economy,Pa. B14 .....7.50
Farrell,Pa. S3 .....7.50
Fontana,Calif. K1 .....8.30
Gary,Ind. U5 .....7.50
Houston S5 .....7.60
Ind.Harbor,Ind. Y1 ....7.50
Johnstown,Pa. B2 .....7.50
Lowellville,O. S3 .....7.50
Munhall,Pa. U5 .....7.50
Newport,Ky. A2 .....7.50
Pittsburgh J5 .....7.50
Seattle B3 .....8.40
Sharon,Pa. S3 .....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2 ..7.50
Youngstown Y1 .....7.50

PLATES, Ingot Iron
Ashland l.c.l.(15) A10 ...5.55
Ashland l.c.l.(15) A10 ...6.05
Cleveland c.l. R22 .....6.05
Warren,O. R2 .....6.05

FLOOR PLATES
Cleveland J5 .....6.375
Claymont,Del. P4 .....6.375
Conshohocken,Pa. A3 ..6.375
Ind.Harbor,Ind. I-2 ...6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
S.Chicago,Ill. U5 .....6.375

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ...5.675
Aliquippa,Pa.(9) J5 ...5.675
Alton,Ill. L1 .....5.875
Atlanta(9) A11 .....5.875
Bessemer,Ala.(9) T2 ...5.675
Birmingham(9) C15 ...5.675
Buffalo(9) R2 .....5.675
Canton,O.(23) R2 .....6.15
Clairton,Pa.(9) U5 ....5.675
Cleveland(9) R2 .....5.675
Ecorse,Mich.(9) G5 ...5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala.(9) T2 ...5.675
Fairless,Pa.(9) U5 ....5.825
Fontana,Calif.(9) K1 ..6.375
Gary,Ind.(9) U5 .....5.675
Houston(9) S5 .....5.925
Ind.Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2 ..5.675
Joliet,Ill. P2 .....5.675
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
LosAngeles(9) B3 .....6.375
Massillon,O.(23) R2 ....6.15
Midland,Pa.(23) C18 ..6.025
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ....6.125
Niles,Calif. P1 .....6.375
Owensboro,Ky.(9) G8 ..6.025
Pittsburg,Calif.(9) C11.6.375
Pittsburgh(9) J5 .....5.675
Portland,Oreg.O4 .....6.425
Riverdale,Ill.(9) A1 ...5.675
Seattle(9) A24,B3,N15..6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5..5.675
S.SanFran.,Calif.(9) B3 6.425
Sterling,Ill.(1)(9) N15..5.675
Sterling,Ill.(9) N15 ....5.775
Struthers,O.(9) Y1 ....5.675
Tonawanda,N.Y. B12 ..5.675
Torrance,Calif.(9) C11.6.375
Warren,O. C17 .....6.025
Youngstown(9) R2, U5.5.675

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.725
Bethlehem,Pa. B2 .....6.725
Bridgeport,Conn. C32 ...6.80
Buffalo R2 .....6.725
Canton,O. R2, T7 .....6.725
Clairton,Pa. U5 .....6.725
Detroit S41 .....6.725
Economy,Pa. B14 .....6.725
Ecorse,Mich. G5 .....6.725
Farrell,Pa. S3 .....6.725
Fontana,Calif. K1 ....7.775
Gary,Ind. U5 .....6.725
Houston S5 .....6.975
Ind.Harbor,Ind. I-2, Y1.6.725
Johnstown,Pa. B2 .....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N.Y. B2 ..6.725
LosAngeles B3 .....7.775
Lowellville,O. S3 .....6.725
Massillon,O. R2 .....6.725
Midland,Pa. C18 .....6.725
Owensboro,Ky. G8 .....6.725
Pittsburgh J5 .....6.725
Seattle(6) B3 .....7.825
Sharon,Pa. S3 .....6.725
S.Chicago R2, U5, W14 6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 .....6.725
Warren,O. C17 .....6.725
Youngstown U5 .....6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 .....8.30
Bessemer,Ala. T2 .....8.30
Bethlehem,Pa. B2 .....8.30
Clairton,Pa. U5 .....8.30
Cleveland R2 .....8.30
Ecorse,Mich. G5 .....8.30
Fairfield,Ala. T2 .....8.30
Fontana,Calif. K1 .....9.00
Gary,Ind. U5 .....8.30
Houston S5 .....8.55
Ind.Harbor,Ind. Y1 ....8.30
Johnstown,Pa. B2 .....8.30
KansasCity,Mo. S5 .....8.55
Lackawanna,N.Y. B2 ...8.30
LosAngeles B3 .....9.00
Pittsburgh J5 .....8.30
Seattle B3 .....9.05
S.Chicago,Ill. R2, W14..8.30
S.Duquesne,Pa. U5 ....8.30
S.SanFrancisco B3 .....9.05
Sterling,Ill. N15 .....7.925
Struthers,O. Y1 .....8.30
Youngstown U5 .....8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 .....5.925
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
Sterling,Ill. N15 .....5.775
Sterling,Ill.(1) N15 ...5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 .....5.675
Atlanta A11 .....5.875
Joliet,Ill. P22 .....5.675
Minnequa,Colo. C10 ....6.125
Niles,Calif. P1 .....6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SanFrancisco S7 .....6.52
Seattle B3 .....6.425

BAR SIZE ANGLES; S. SHAPES Wrought Iron
Economy,Pa. B14 .....16.45

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....7.05
KansasCity,Mo. S5 .....7.05
Pittsburgh J5 .....6.80
Youngstown U5 .....6.80

BARS, C.F. Leaded (Including leaded extra) Carbon
LosAngeles P2, S30...11.75*

Alloy
Ambridge,Pa. W18 ...10.175
BeaverFalls,Pa. M12..10.175
Camden,N.J. P13 .....10.35
Chicago W18 .....10.175
Elyria,O. W8 .....10.175
Monaca,Pa. S17 .....10.175
Newark,N.J. W18 ....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.5c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....7.65
BeaverFalls,Pa. M12,R2 7.65
Birmingham C15 .....8.25
Buffalo B5 .....7.70
Camden,N.J. P13 .....8.10
Carnegie,Pa. C12 .....7.65
Chicago W18 .....7.65
Cleveland A7, C20 ....7.65
Detroit B5, H5, P17 ....7.85
Detroit S41 .....7.65
Donora,Pa. A7 .....7.65
Elyria,O. W8 .....7.65
FranklinPark,Ill. N5 ...7.65
Gary,Ind. R2 .....7.65
GreenBay,Wis. F7 .....7.65
Hammond,Ind. J5, L2 ..7.65
Hartford,Conn. R2 ....8.15
Harvey,Ill. B5 .....7.65
LosAngeles(49) S30 ....9.10
LosAngeles(49) P2, R2..9.10
Mansfield,Mass. B5 ....8.20
Massillon,O. R2, R8 ...7.65
Midland,Pa. C18 .....7.65
Monaca,Pa. S17 .....7.65
Newark,N.J. W18 .....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 .....7.65
Plymouth,Mich. P5 .....7.90
Putnam,Conn. W18 ....8.20
Readville,Mass. C14 ....8.20
Seattle(49) S30 .....9.10
S.Chicago,Ill. W14 .....7.65
SpringCity,Pa. K3 .....8.10
Struthers,O. Y1 .....7.65
Warren,O. C17 .....7.65
Waukegan,Ill. A7 .....7.65
Willimantic,Conn. J5 ....8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Alloy (Turned and Ground)
Cumberland,Md.(5) C19 6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 .....9.025
BeaverFalls,Pa. M12,R2 9.025
Bethlehem,Pa. B2 .....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 .....9.025
Camden,N.J. P13 .....9.20
Canton,O. T7 .....9.025
Carnegie,Pa. C12 .....9.025
Chicago W18 .....9.025
Cleveland A7, C20 .....9.25
Detroit B5, P17 .....9.225
Detroit H5, S41 .....9.025
Donora,Pa. A7 .....9.025
Elyria,O. W8 .....9.025
FranklinPark,Ill. N5 ..9.025
Gary,Ind. R2 .....9.025
GreenBay,Wis. F7 ....9.025

Hammond,Ind. J5, L2. .9.025
Hartford,Conn. R2 ....9.325
Harvey,Ill. R5 .....9.025
Lackawanna,N.Y. B3 ..9.025
LosAngeles P2, S30 ...11.00
Mansfield,Mass. B5 ...9.325
Massillon,O. R2, R8 ...9.025
Midland,Pa. C18 .....9.025
Monaca,Pa. S17 .....9.025
Newark,N.J. W18 .....9.20
Plymouth,Mich. P5 ...9.225
S.Chicago,Ill. W14 .....9.025
SpringCity,Pa. K3 .....9.20
Struthers,O. Y1 .....9.025
Warren,O. C17 .....9.025
Waukegan,Ill. A7 ....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ...9.325
Youngstown F3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

Atlanta A11 .....5.00
Birmingham C15 .....5.25
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ..6.425
Fontana,Calif. K1 ....6.375
Ind.Harbor,Ind. Y1 ....5.675
Johnstown,Pa. B2 ....5.675
Joliet,Ill. P22 .....5.675
Kokomo,Ind. C16 ....5.775
Lackawanna,N.Y. B2 ..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.475
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ..6.125
Niles,Calif. P1 .....6.375
Pittsburgh J5 .....5.675
Portland, Oreg. O4 ....6.425
Seattle A24, B3, N14 ..6.425
S.Chicago,Ill. W14 ....5.675
S.SanFrancisco B3 ...6.425
SparrowsPoint,Md. B2 .5.675
Steelton,Pa. B2 .....5.675
Sterling,Ill. (1) N15 ..5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ..6.10

BARS, Reinforcing, Billet (Fabricated, to Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Johnstown,Pa. B2 .....7.33
Lackawanna,N.Y. B2 ..7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
Seattle A24, B3, N14 ..7.95
SparrowsPoint,Md. B2 ..7.33
St.Paul U8 .....8.17

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 16.10
Economy,Pa.(D.R.)B14 20.50
Econ.(DirectRolled)B14 13.55
Economy(Staybolt)B14 20.50
McK.Rks.(S.R.) L5 ...16.10
McK.Rks.(D.R.) L5 ...20.50
McK.Rks.(DirRolled)L5 13.55

BARS, Rail Steel

ChicagoHts.(3) C2, I-2 5.575
ChicagoHts.(4)(44) I-2 5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa.(3) F5 ...5.575
Franklin,Pa.(4) F5 ...5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O.(3) P11 ....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1 5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 ....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14 ..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 .....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 .....6.275

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ..7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14 7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2 .7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ...7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ....5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ..7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2 .6.275
Steubenville,O. W10 ....6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 .....6.275
Yorkville,O. W10 .....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(38) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(33) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.125	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	....7.125	....
Fairfield,Ala. T2	7.125	7.375
Gary,Ind. U5	....7.125	7.375
GraniteCity,Ill.G4	7.225	....
Ind.Harbor I-2	..7.225	7.425
Irvin,Pa. U5	....7.125	7.375
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.125	7.375
Pitts.,Calif. C11	.7.875	....
Pittsburgh J5	....7.125	....
SparrowsPt. B2	.7.225	....
Weirton W6	....7.125	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....7.475

SHEETS, Enameling

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
SparrowsPoint,Md. B2..6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel

Follansbee,W.Va. W10 7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 .....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1) 9.525

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325
Geneva,Utah C11 .....6.80

SHEETS, Galvanized High-Strength, Low Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.175
Irvin,Pa. U5 .....7.175

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Canfield,O. C3 .....7.50
Cleveland (28) R2 .....7.65
Niles,O. (28) R2 .....7.65
Weirton,W.Va. W6 .....7.50

SHEETS, Galvanized Steel Hot-Dipped§

AlabamaCity,Ala. R2 .6.875‡
Ashland,Ky. A10 ....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ..6.975*
Ind.H'rb'r,Ind. I-2, Y1 6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 ....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ..6.875†
Pittsburg,Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ...6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous. §For minimum spangled add 0.15c.

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A25 Algoma Steel Corp. Ltd.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C3 Canfield Steel Co.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire Div., Hoover Ball & Bearing
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E2 Eastern Stainless Steel
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimons Steel Co.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H5 Hercules Drawn Steel
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.
J10 Jay Steel Corp.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.
M23 Mill Strip Products Co. of Pennsylvania

N1 National Standard Co.
N2 National Supply, Armco Steel Corp.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N17 National Steel Corp.
N20 Neville Ferro Alloy Co.

O1 Ohio Ferro-Alloys Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P25 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div. Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Div., Bliss & Laughlin Inc.
S31 Sawhill Tubular Products
S40 Seneca Steel Service
S41 Stainless & Strip Div., J & L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America
S45 Somers Brass Co.
S46 Steel Co. of Canada
S47 Seaway Steel Corp.

T2 Tenn. Coal & Iron Div. U. S. Steel Corp.
T3 Tenn. Products & Chemical
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope, Armco Steel Corp.
U4 Universal-Cyclops Steel
U5 U. S. Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloy Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Div., National Steel Corp.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	5.10
Allenport,Pa. P7	5.10
Alton,Ill. L1	5.30
Ashland,Ky.(8) A10	5.10
Atlanta A11	5.10
Bessemer,Ala. T2	5.10
Birmingham C15	5.10
Conshohocken,Pa. A3	5.15
Detroit M1	5.10
Ecorse,Mich. G5	5.10
Fairfield,Ala. T2	5.10
Farrell,Pa. S3	5.10
Fontana,Calif. K1	5.825
Gary,Ind. U5	5.10
Ind.Harbor,Ind. I-2, Y1	5.10
Johnstown,Pa.(25) B2	5.10
Lackaw'na,N.Y.(25) B2	5.10
LosAngeles(25) B3	5.85
LosAngeles C1	8.60
Minnequa,Colo. C10	6.20
Riverdale,Ill. A1	5.10
SanFrancisco S7	6.60
Seattle(25) B3	6.10
Seattle N14	6.60
Sharon,Pa. S3	5.10
S.Chicago,Ill. W14	5.10
S.SanFrancisco(25) B3	5.85
SparrowsPoint,Md. B2	5.10
Torrance,Calif. C11	5.85
Warren,O. R2	5.10
Weirton,W.Va. W6	5.10
Youngstown U5, Y1	5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18	8.40
Farrell,Pa. S3	8.40
Gary,Ind. U5	8.40
Houston S5	8.65
Ind.Harbor,Ind. Y1	8.40
KansasCity,Mo. S5	8.65
LosAngeles B3	9.60
Lowellville,O. S3	8.40
Newport,Ky. A2	8.40
Sharon,Pa. A2, S3	8.40
S.Chicago,Ill. W14	8.40
Youngstown U5, Y1	8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10	7.575
Bessemer,Ala. T2	7.575
Conshohocken,Pa. A3	7.575
Ecorse,Mich. G5	7.575
Fairfield,Ala. T2	7.575
Farrell,Pa. S3	7.575
Gary,Ind. U5	7.575
Ind.Harbor,Ind. I-2, Y1	7.575
Lackawanna,N.Y. B2	7.575
LosAngeles(25) B3	8.325
Seattle(25) B3	8.575
Sharon,Pa. S3	7.575
S.Chicago,Ill. W14	7.575
S.SanFrancisco(25) B3	8.325
SparrowsPoint,Md. B2	7.575
Warren,O. R2	7.575
Weirton,W.Va. W6	7.575
Youngstown U5, Y1	7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	5.35
Warren,O. R2	5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	7.425
Baltimore T6	7.425
Boston T6	7.975
Buffalo S40	7.425
Cleveland A7	7.425
Dearborn,Mich. S3	7.425
Detroit D2, M1, P20	7.425
Dover,O. G6	7.425
Evanston,Ill. M22	7.425
Farrell,Pa. S3	7.425
Follansbee,W.Va. W10	7.425
Fontana,Calif. K1	9.20
FranklinPark,Ill. T6	7.425
Ind.Harbor,Ind. Y1	7.425
Indianapolis S41	7.575
LosAngeles C1, S41	9.30
McKeesport,Pa. E10	7.525
NewBedford,Mass. R10	7.875
NewBritain,Con. S15	7.875
NewCastle,Pa. B4, M23	7.425
NewHaven,Conn. D2	7.875
NewKensington,Pa. A6	7.425
Pawtucket,R.I. R3, N8	7.975
Philadelphia P24	7.875
Riverdale,Ill. A1	7.425
Rome,N.Y.(32) R6	7.425
Sharon,Pa. S3	7.425
Trenton,N.J.(31) R5	8.875
Warren,O. R2, T5	7.425
Worcester,Mass. A7	7.975
Youngstown Y1	7.425
Youngstown S41	7.425

STRIP, Cold-Rolled Alloy

Boston T6	15.90
Carnegie,Pa. S18	15.55
Cleveland A7	15.55
Dover,O. G6	15.55
Farrell,Pa. S3	15.55
FranklinPark,Ill. T6	15.55
Harrison,N.J. S18	15.55
Indianapolis S41	15.70
LosAngeles S41	17.75
Lowellville,O. S3	15.55
Pawtucket,R.I. S8	15.90
Riverdale,Ill. A1	15.55
Sharon,Pa. S3	15.55
Worcester,Mass. A7	15.85
Youngstown S41	15.55

STRIP, Cold-Rolled High Strength, Low-Alloy

Cleveland A7	10.80
Dearborn,Mich. S3	10.80
Dover,O. G6	10.80
Farrell,Pa. S3	10.80
Ind.Harbor,Ind. Y1	10.80
Sharon,Pa. S3	10.80
Warren,O. R2	10.80
Weirton,W.Va. W6	10.80
Youngstown Y1	10.80

STRIP, Galvanized (Continuous)

Farrel,Pa. S3	7.50
Sharon,Pa. S3	7.50

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Anderson,Ind. G6	9.10	....	....	....	....
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	9.05	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, M23	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	18.85	22.95	27.80
Buffalo W12	18.85	....	....
Fostoria,O. S1	19.05	22.15	....
FranklinPark,Ill. T6	19.20	23.30	28.15
Harrison,N.J. C18	18.85	22.95	27.80
NewYork W3	18.85	22.95	27.80
Palmer,Mass. W12	18.85	....	....
Trenton,N.J. R5	18.85	22.95	27.80
Worcester,Mass. A7, T6	18.85	22.95	27.80
Youngstown S41	19.20	23.30	28.15

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.10	9.35	9.75
Fairless,Pa. U5	9.10	9.35	9.75
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.85
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irvin,Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9.35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Weirton,W.Va. W6	9.10	9.35	9.75
Yorkville,O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)			
Aliquippa,Pa. J5 (21-27 Ga.)	7.90	8.10	....
IndianaHarbor,Ind. Y1 (20-27 Ga.)	7.90	....	....
Niles,O. R2 (20-27 Ga.)	7.90	8.10	8.30

ELECTROLYTIC THIN TIN PLATE (¼ lb coating in coils)

	Base Box 45 lb	50 lb	55 lb	60 lb
Fairfield,Ala. T2	$6.10	$6.25	$6.40	$6.55
Fairless,Pa. U5	6.10	6.25	6.40	6.55
Gary,Ind. U5	6.10	6.25	6.40	6.55
IndianaHarbor,Ind. I-2	6.10	6.25	6.40	6.55
Irvin,Pa. U5	6.10	6.25	6.40	6.55
SparrowsPoint,Md. B2	6.10	6.25	6.40	6.55
Weirton,W.Va. W6	6.10	6.25	6.40	6.55

Tin Plate,Hot Dipped 1.25 lb Common Coke	1.50 lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.40	10.65
Fairless,Pa. U5	10.40	10.65
Fontana,Calif. K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Irvin,Pa. U5	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va. W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$8.20
Fairfield,Ala. T2	8.20
Fairless,Pa. U5	8.20
Fontana,Calif. K1	8.85
Gary,Ind. U5	8.20
GraniteCity,Ill. G4	8.30
Ind.Harbor,Ind. I-2, Y1	8.20
Irvin,Pa. U5	8.20
Niles,O. R2	8.20
Pittsburg,Calif. C11	8.85
SparrowsPoint,Md. B2	8.20
Weirton,W.Va. W6	8.20
Yorkville,O. W10	8.20

HOLLOWARE ENAMELING (Black Plate) (29 Gage)

Aliquippa,Pa. J5	7.85
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. Y1	7.85
Irvin,Pa. U5	7.85
Yorkville,O. W10	7.85

STRIP, C.R., Electrogalvanized

Cleveland A7	7.425*
Dover,O. G6	7.425*
Evanston,Ill. M22	7.525*
McKeesport,Pa. E10	7.50*
NewCastle,Pa. M23	7.425*
Riverdale,Ill. A1	7.525*
Warren,O. B9, S3, T5	7.425*
Worcester,Mass. A7	7.975
Youngstown S41	7.425*

*Plus galvanizing extras.

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	8.175

TIGHT COOPERAGE HOOP

Atlanta A11	5.825
Farrell,Pa. S3	5.525
Riverdale,Ill. A1	5.675
Sharon,Pa. S3	5.525
Youngstown U5	5.525

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	9.875*	11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles,O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren,O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Mansfield,O. E6	8.10
Vandergrift,Pa. U5	8.10
Warren,O. R2 (Locore)	8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
Beech Bottom,W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	....	19.70	20.20	20.70
Vandergrift,Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. §Coil annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	8.00
Aliquippa,Pa. J5	8.00
Alton,Ill. L1	8.20
Atlanta A1	8.00
Bartonville,Ill. K4	8.10
Buffalo W12	8.00
Chicago W13	8.00
Cleveland A7, C20	8.00
Crawfordsville,Ind. MS	8.10
Donora,Pa. A7	8.00
Duluth A7	8.00
Fairfield,Ala. T2	8.00
Fostoria,O.(24) S1	8.10
Houston S5	8.25
Jacksonville,Fla. M8	8.35
Johnstown,Pa. B2	8.00
Joliet,Ill. A7	8.00
KansasCity,Mo. S5	8.25
Kokomo,Ind. C16	8.10
LosAngeles B3	8.95
Minnequa,Colo. C10	8.25
Monessen,Pa. P7, P16	8.00
Palmer,Mass. W12	8.30
Pittsburg,Calif. C11	8.95
Portsmouth,O. P12	8.00
S.Chicago,Ill. R2	8.00
S.SanFrancisco C10	8.95
SparrowsPoint,Md. B2	8.10
Sterling,Ill.(1) N15	8.00
Sterling,Ill. N15	8.10
Struthers,O. Y1	8.00
Waukegan,Ill. A7	8.00
Worcester,Mass. A7	8.30

WIRE, Cold Heading Carbon

Elyria,O. W8	8.00

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4	12.65
Buffalo W12	13.40
Cleveland A7	12.65
Donora,Pa. A7	12.65
Duluth A7	12.65
Johnstown,Pa.(10) B2	12.65
KansasCity,Mo. U3	12.90
LosAngeles(2) B3	13.60
Minnequa,Colo. C10	12.775
Monessen,Pa. P7, P16	12.65
Muncie,Ind. I-7	13.60
NewHaven,Conn. A7	12.95
Palmer,Mass. W12	13.70
Pittsburg,Calif. C11	13.45
Portsmouth,O. P12	12.65
Roebling,N.J. R5	12.95
SparrowsPt.,Md.(10) B2	12.75
Struthers,O. Y1	13.40
Trenton,N.J. A7	12.95
Waukegan,Ill. A7	12.65
Worcester,Mass. A7	12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5	9.75
Alton,Ill. L1	9.95
Buffalo W12	9.75
Cleveland A7	9.75
Donora,Pa. A7	9.75
Duluth A7	9.75
Johnstown,Pa. B2	9.75
KansasCity,Mo. S5, U3	10.00
Kokomo,Ind. C16	9.85
LosAngeles B3	10.70
Minnequa,Colo. C10	9.95
Monessen,Pa. P7, P16	9.75
NewHaven,Conn. A7	10.95
Palmer,Mass. W12	10.05
Pittsburg,Calif. C11	10.075
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
S.Chicago,Ill. R2	9.75
S.SanFrancisco C10	10.70
SparrowsPt.,Md. B2	9.85
Struthers,O. Y1	9.75
Trenton,N.J. A7	10.05
Waukegan,Ill. A7	9.75
Worcester,Mass. A7	10.05

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5	9.75
Alton,Ill. L1	9.95
Bartonville,Ill. K4	9.85
Buffalo W12	9.75
Cleveland A7	9.75
Donora,Pa. A7	9.75
Duluth A7	9.75
Fostoria,O. S1	9.80
Johnstown,Pa. B2	9.75
KansasCity,Mo. S5, U3	10.00
LosAngeles B3	10.20
Milbury,Mass.(12) N6	10.05
Minnequa,Colo. C10	9.95
Monessen,Pa. P7, P16	9.75
Muncie,Ind. I-7	9.95
Palmer,Mass. W12	10.05
Pittsburg,Calif. C11	10.20
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
S.Chicago,Ill. R2	9.75
S.SanFrancisco C10	10.70
SparrowsPt.,Md. B2	9.85
Struthers,O. Y1	9.75
Trenton,N.J. A7	10.05
Waukegan,Ill. A7	9.75
Wor'ster,Mass. A7, J4, T6	10.05

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	16.50
Bartonville,Ill. K4	16.40
Chicago W13	16.30
Cleveland A7	16.30
Crawfordsville,Ind. MS	16.40
Fostoria,O. S1	16.30
Houston S5	16.55
Jacksonville,Fla. M8	16.65
Johnstown,Pa. B2	16.30
KansasCity,Mo. S5	16.55
Kokomo,Ind. C16	16.30
Minnequa,Colo. C16	16.55
Monessen,Pa. P16	16.30
Muncie,Ind. I-7	16.50
Palmer,Mass. W12	16.60
S.SanFrancisco C10	17.15
Waukegan,Ill. A7	16.30
Worcester,Mass. A7, J6	16.60

ROPE WIRE (A)

Bartonville,Ill. K4	13.45
Buffalo W12	13.45
Fostoria,O. S41	13.45
Johnstown,Pa. B2	13.45
Monessen,Pa. P7	13.45
Muncie,Ind. I-7	13.65
Palmer,Mass. W12	13.75
Portsmouth,O. P12	13.45
Roebling,N.J. R5	13.75
St.Louis L8	13.45
SparrowsPt.,Md. B2	13.55
Struthers,O. Y1	13.45
Worcester,Mass. J4	13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Tire Bead

Bartonville,Ill. K4	17.15
Monessen,Pa. P16	17.15
Roebling,N.J. R5	17.65

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Evanston,Ill. M22	12.45
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
NewCastle,Pa. M23	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7, T6	12.65

NAILS, Stock Sizes

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, Cut (100 lb kegs)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

TIE WIRE, Automatic Baler (14½ Ga.) (per 97 lb net box) Coil No. 3150

AlabamaCity,Ala. R2	$8.78
Atlanta A11	10.36
Bartonville,Ill. K4	8.88
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	8.88
Donora,Pa. A7	8.78
Duluth A7	8.78
Fairfield,Ala. T2	8.78
Houston S5	9.02
Jacksonville,Fla. M8	8.88
Johnstown,Pa. B2	8.78
Joliet,Ill. A7	8.78
KansasCity,Mo. S5	9.02
Kokomo,Ind. C16	8.88
LosAngeles B3	9.20
Minnequa,Colo. C10	8.02
Pittsburg,Calif. C11	9.20
S.Chicago,Ill. R2	8.78
S.SanFrancisco C10	9.94
SparrowsPt.,Md. B2	8.88
Sterling,Ill.(37) N15	8.88

Coil No. 6500 Stand. 100 lb coil

AlabamaCity,Ala. R2	$9.06
Atlanta A11	10.70
Bartonville,Ill. K4	9.16
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.16
Donora,Pa. A7	9.06
Duluth A7	9.06
Fairfield,Ala. T2	9.06
Houston S5	9.30
Jacksonville,Fla. M8	9.16
Johnstown,Pa. B2	9.06
Joliet,Ill. A7	9.06
KansasCity,Mo. S5	9.30
Kokomo,Ind. C16	9.16
LosAngeles B3	9.50
Minnequa,Colo. C10	9.30
Pittsburg,Calif. C11	9.50
S.Chicago,Ill. R2	9.06
S.SanFrancisco C10	10.26
SparrowsPt.,Md. B2	9.16
Sterling,Ill.(37) N15	9.16

Coil No. 6500 Interim 100 lb coil

AlabamaCity,Ala. R2	$9.11
Atlanta A11	10.75
Bartonville,Ill. K4	9.21
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.21
Donora,Pa. A7	9.11
Duluth A7	9.11
Fairfield,Ala. T2	9.11
Houston S5	9.35
Jacksonville,Fla. M8	9.21
Johnstown,Pa. B2	9.11
Joliet,Ill. A7	9.11
KansasCity,Mo. S5	9.35
Kokomo,Ind. C16	9.21
LosAngeles B3	9.55
Minnequa,Colo. C10	9.35
Pittsburg,Calif. C11	9.55
S.Chicago,Ill. R2	9.11
S.SanFrancisco C10	10.31
SparrowsPt.,Md. B2	9.21
Sterling,Ill.(37) N15	9.21

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	212
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS

	Col.
Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	197**
Bartonville,Ill. K4	199
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198

WIRE (16 gage)	An'ld Stone	Galv. Stone
Ala.City,Ala.R2	17.85	19.40**
Aliq'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Chicago W13	17.85	....
Cleveland A7	17.85	....
Craw'sville M8	17.95	19.80‡‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	17.95	19.80‡‡
Johnstown B2	17.85	19.65§
Kan.City,Mo. S5	18.10	....
Kokomo C16	17.95	19.50†
Minnequa C10	18.10	19.65**
P'lm'r,Mass.W12	19.10	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
SparrowsPt. B2	17.95	19.75§
St'ling(37) N15	17.95	19.80
Waukegan A7	17.85	19.40†
Worcester A7	18.15	....

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½Ga.J5	190§
Atlanta A11	191**
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(42) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A1	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192

WIRE, Merchant Quality

	6 to 8 gage	An'ld	Galv.
Ala.City,Ala.	R2	9.00	9.55**
Aliquippa	J5	8.65	9.325§
Atlanta(48)	A11	9.00	9.75*
Bartonville(48)	K4	9.85	19.90
Buffalo	W12	9.00	9.55**
Chicago	W13	9.00	9.55**
Cleveland	A7	9.00	...
Crawfordsville	M8	9.10	9.80††
Donora,Pa.	A7	9.00	9.55†
Duluth	A7	9.00	9.55†
Fairfield	T2	9.00	9.55
Houston(48)	S5	9.25	9.80**
Jack'vill,Fla.	M8	9.10	9.80‡‡
Johnstown(48)	B2	9.00	9.675§
Joliet,Ill.	A7	9.00	9.55†
KansasCity(48)	S5	9.25	9.80**
Kokomo(48)	S16	9.10	9.65†
LosAngeles	B3	9.95	10.625§
Minnequa	C10	9.25	9.80**
Monessen(48)	P7	8.65	9.35§
Palmer,Mass.	W12	9.30	9.85†
Pitts.,Calif.	C11	9.95	10.50†
Rankin,Pa.	A7	9.00	9.55†
S.Chicago	R2	9.00	9.55**
S.SanFran.	C10	9.95	10.50**
Spar'wsPt.(48)	B2	9.10	9.775§
St'ling(37)(48)	N15	9.10	9.80
Struthers,O.	Y1	9.00	9.65‡
Worcester,Mass.	A7	9.30	9.85†

Based on zinc prices of: *13.50c. †5c. §10c. ‡Less than 10c. ††10.50c. ‡‡11.10c. **Subject to zinc equalization extras.

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great. Structural ½ in. larger 12.85 7/16 in. and smaller by 6 in. and shorter: 15% off list.

FASTENERS

Prices are in process of being revised upward and new schedule will be published as soon as available.

(Consumer discounts per cent off list prices, orders for 1 container for assorted sizes: for less than container quantities, add 25 per cent; attaching nuts to bolts, package sizes, add 7.5 per cent: heavy hex nuts 1¼ in. through 1½ in. tapped 8 threads, add 10 per cent.)

HEX HEAD CAP SCREWS, coarse, or fine thread, packaged or bulk, with or without hex nuts, 1020 steel bright and high carbon heat treated, ¼ in. thru 1 in. diam., listed lengths:

Hot Galvanized and Zinc Plated:	
Packaged	39.25
Bulk	46

BOLTS, Standard stock sizes:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	39.25
*Bulk	46

*Hot galvanized or zinc plated lag bolts only—for package or bulk quantities use applicable list less bulk discounts.

CAP AND SETSCREWS,

Fillister Head, Cap Screws, Coarse Thread:

Packaged	+55
Bulk	+16

Flat Head Cap Screws:

¾ in. and smaller, 6 in. and shorter:	
Packaged	+35
Bulk	+38

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam., 6 in. and shorter:	
Packaged	+5
Bulk	19
Through 1 in. diam., longer than 6 in.:	
Packaged	+29

HEXAGON NUTS: American Standard: Finished hex, hex jam, and hex slotted coarse or fine thread, ¼ in. through 3 in., finished hex thick, thick and slotted, castle, fine thread, ¼ in. through 1½ in., semifinished hex heavy, heavy and jam, heavy and slotted, coarse thread, ¼ in. through 4 in., and

SQUARE NUTS, American Standard: Regular square and heavy square, coarse thread, ¼ in. through 2 in.: 50

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	39.25
Bulk	46

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over.)

	Standard Diameter, Inches				
	1/4	5/16	3/8	7/16	1/2
Buffalo W12	$26.20	$38.50	$47.90	$61.30	$80.30
KansasCity,Mo. U3	26.20	38.50	47.90	61.30	80.30
Minnequa,Colo. C10	26.20	38.50	47.90	61.30	80.30
Pittsburg,Calif. C11	26.20	38.50	47.90	61.30	80.30
Roebling,N.J. R5	26.20	38.50	47.90	61.30	80.30
SparrowsPoint,Md. B2	26.20	38.50	47.90	61.30	80.30
St. Louis L8	26.20	38.50	47.90	61.30	80.30
Waukegan,Ill. A7	26.20	38.50	47.90	61.30	80.30

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut length 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.12
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	58.17	40.26
2½	12	49.24	57.72	43.70
2½	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.65	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	7.025

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

SCREW SPIKES

Lebanon,Pa. B2	15.10

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	15.35
Seattle B3	15.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2, Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

FOOTNOTES

(1) Chicago base.
(2) Double galvanized.
(3) Merchant.
(4) Reinforcing.
(5) 1½ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Limited analyses only.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Bethany A coating.
(12) Worcester, Mass., base.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds and 2½ in. and smaller hexagons; 9.625c for larger rounds and hexagons and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.75		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 11.50c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	43.50
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	46.75
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	45.00
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	49.50
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	29.50	39.50	40.50	44.25	46.75	45.75	52.00	49.50
304L	....	37.25	47.25	48.25	52.00	54.50	53.50	59.75	57.25
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.75	75.75	71.75	80.75	76.75
316L	....	55.25	72.25	76.25	79.50	83.50	79.50	88.50	84.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.50	62.25
380	....	....	123.25	....	98.75	143.75	135.00	149.25	149.25
18-8 Cb-Ta	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	75.25
403	....	....	26.75	....	29.75	31.50	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	26.75	31.00	29.75	31.50	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	38.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	42.00
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Somers Brass Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steels, Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates—Carbon Base 5%	10%	15%	20%	Sheets—Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	49.80	61.35	72.80	84.40	....
Nickel	43.20	55.05	66.95	78.90	....
Nickel, Low Carbon	43.50	55.70	67.95	80.35	....
Monel	44.25	55.35	66.45	77.60	....

	Strip, Carbon Base—Cold Rolled— 10%	Both Sides
Copper*	36.10	43.00

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. P4; Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	Hi-Carbon-Cr (D-11)	0.955
Spec. Carbon (W-1)	0.385	V-Cr Hot Work (H-13)	0.550
Oil Hardening (O-1)	0.505	W-Cr Hot Work (H-12)	0.530
V-Cr Hot Work (H-11)	0.505	W Hot Wk (H-21)	1.425-1.44

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

Prices in dollars per gross ton, f.o.b. (rail) furnace; add 50 cents when shipped by truck. Maximum delivered prices are approximate and based on rail shipment.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
Birmingham R2	62.00	62.50**	66.50	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	68.81	69.31	69.31	69.81
Muskegon, Mich., deld.	....	74.46	74.46	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	75.41	75.91	....
Newark, N.J., deld.	72.53	73.03	73.53	74.03
Philadelphia, deld.	70.18	70.68	71.18	71.68
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Boston, deld.	75.20	75.70	76.20	76.70
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), deld.	....	68.31	68.31	68.81
Monaca, Pa., deld.	....	68.33	68.33	68.83
Lawrenceville, W. Homestead, Wilmerding, Pa., deld.	....	68.68	68.68	69.18
Verona, Trafford, Pa., deld.	68.83	69.33	69.33	69.83
Brackenridge, Pa., deld.	69.16	69.66	69.66	70.16
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....

	Basic	No. 2 Foundry	Malleable	Bessemer
Other U. S. Districts				
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
Granite City, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	62.00	62.50‡	66.50	67.00
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....
Mansfield, Ohio, deld.	....	....	71.34	....
Canadian District				
Hamilton, Ont. S46	65.00	65.00	65.50	....
Port Colborne, Ont. A25	65.00	65.00	65.50	66.00
Sault Ste. Marie, Ont. A25	65.00	65.00	65.50	66.00

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%. Foundry grade, 1.75% or under, deduct 50c.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 13%; starting with silicon over 13% add $1 per ton for each 0.50% silicon or portion thereof up to 14%; over 14%, price is $93 with $1 differential; add $1 for each 0.50% Mn over 1%)

Buffalo H1	$79.25
Jackson, Ohio I-3, J1	78.00
Port Colborne, Ont. A25	78.50
Toledo, Ohio I-3	78.00

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.50% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Calvert City, Ky. P15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry. K2	89.00
Keokuk, Iowa O.H. & Fdry. 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS IRON, Gross Ton

Birdsboro, Pa. B10 (Phos. 0.075% max)	$73.00
Lyles, Tenn. T3 (Phos. 0.035% max)	73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Buffalo H1 (Intermediate) (0.036-0.075% max)	71.50
Chicago I-3 (Phos. 0.075% max)	71.00
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Phos. 0.075% max)	71.00
Erie, Pa. I-3 (Phos. 0.075% max)	71.00
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00

Steel Service Center Products

Representative prices, cents per pound, f.o.b. warehouse, for 2000 lb orders. Prices will vary with total weight of the order. City delivery charges are 15 cents per 100 lb except: Denver, 20 cents; Baltimore, Boston, New York, Philadelphia, San Francisco, 10 cents; Atlanta, Birmingham, Dallas, Houston, Los Angeles, Seattle, no charge.

	SHEETS			STRIP	BARS			STRUCTURAL	PLATES	
	Hot Rolled	Cold Rolled	Galv.	Hot Rolled	H.R. Rounds	C.F. Rounds	H.R. Alloy 4140	SHAPES	Carbon	Floor
Atlanta	9.37	10.61	11.85	10.85	9.53	13.24	....	9.94	9.73	11.16
Baltimore	9.50	10.26	10.06	11.25	9.65	11.70	16.38	9.85	9.60	11.10
Birmingham	8.46	10.20	10.59	9.45	8.26	13.14	16.65	8.47	8.41	10.05
Boston	9.90	10.40	11.52	12.40	10.05	13.35	16.59	10.50	9.83	11.85
Buffalo	9.30	10.05	11.80	11.70	9.45	11.45	16.30	9.90	9.40	11.80
Charlotte, N. C.	9.95	11.22	10.55	11.35	10.00	12.68	....	10.20	9.95	11.75
Chicago	9.22	10.20	10.70	11.39	9.22	10.65	15.95	9.57	9.06	11.35
Cincinnati	9.38	10.26	10.75	11.71	9.33	11.53	16.27	10.14	9.44	11.68
Cleveland	9.22	10.66	10.92	11.51	9.33	11.25	16.06	9.96	9.30	11.59
Dallas	9.07	9.88	11.75	10.63	8.48	12.98	16.95	8.71	8.31	9.68
Detroit	9.48	10.46	11.05	11.76	9.53	11.01	16.23	10.14	9.43	11.61
Denver	9.41	11.77	12.11	9.86	10.10	11.47	....	10.02	9.69	11.83
Houston	8.67	9.48	11.35	10.23	8.08	13.10	16.55	8.31	7.91	11.57
Indianapolis	9.66	10.64	11.14	11.83	9.66	11.09	16.39	10.01	9.50	11.79
Kansas City	9.21	10.87	11.35	10.87	9.31	11.57	15.72	9.80	9.10	....
Los Angeles	10.35	11.20	12.10	12.40	10.25	14.20	17.35	10.45	10.30	12.30
Memphis, Tenn.	9.63	10.35	10.80	11.29	9.48	12.70	16.53	9.67	9.32	11.18
Milwaukee	9.36	10.34	10.84	11.53	9.36	10.89	16.09	9.79	9.20	11.49
Moline, Ill.	9.57	10.55	11.05	11.74	9.57	11.00	16.30	9.92	9.41	11.70
Newark, N. J.	9.81	10.34	11.54	12.37	10.05	13.25	16.40	10.35	9.79	11.82
New York	10.07	10.78	11.35	12.37	10.44	13.25	16.40	10.90	10.22	11.82
Philadelphia	9.50	10.00	10.66	11.25	9.65	11.95	16.38	9.85	9.60	11.10
Pittsburgh	9.22	10.53	11.68	11.49	9.22	11.25	15.95	9.57	9.06	11.35
Portland, Oreg.	10.40	12.25	12.35	12.40	10.40	16.65	17.85	11.00	10.55	12.70
St. Louis	9.42	10.58	11.08	11.59	9.44	11.28	16.33	9.80	9.28	11.59
St. Paul	9.57	10.24	11.39	11.74	9.57	11.49	16.54	9.92	9.41	11.70
San Francisco	10.65	11.65	11.75	12.70	10.55	15.10	17.25	11.10	10.80	12.95
Seattle	11.35	12.45	13.40	12.80	10.80	16.20	17.85	11.50	10.95	13.60
Spokane, Wash.	11.20	12.30	13.25	12.65	10.65	16.20	17.85	11.35	10.80	13.45

Specifications: Hot rolled sheet, sheared edge, 10 Ga. & 36 x 96-120 in.; cold rolled sheets, 20 Ga. & 36 x 96-120 in.; galvanized sheets, 10 Ga. x 36 x 120 in. except Los Angeles, Dallas and Houston, 10 Ga. x 48 x 120 in.; hot rolled strip, ⅛ in. x 1 in.; hot rolled carbon bars, rounds, ¾ in.—1¼ in., M1020; cold finished bars, 1 in., C1018; hot rolled alloy bars, 4140 annealed, 1⅝ in.—2⅝ in. rounds; structural shapes, I beams, 6 x 12½ in.; carbon plate, sheared, through ½ in. x 84 in.; floor plates, ¼ in. x 36 in.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hitchins, Olive Hill, Ky., Athens, Troup, Tex., Clearfield, Curwensville, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo.; Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., Frostburg, Md., $133; Templeton, Pa., $135; Salina, Pa., $138; Niles, Ohio, $139; Lehi, Utah, $175.

Super-Duty: Ironton, Ohio, St. Louis, Mexico, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Frostburg, Md., $200; Stevens Pottery, Ga., $210; Troup, Tex., $215; Lehi, Utah, $263.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Hawstone, Thompsontown, Pa., Ensley, Ala., Portsmouth, Ohio, St. Louis, $158; Warren, Niles, Windham, Ohio, $163; E. Chicago, Ind., Joliet, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $133; Philadelphia, Clearfield, Pa., $138; Warren, Ohio, $148.

Ladle Brick (per 1000 pieces*)

Dry-Pressed: Alsey, Ill., Johnstown, Pa., Vandalia, Mo., $97; Chester, New Cumberland, W. Va., Freeport, Vanport, Merrill Station, Clearfield, Pa., Wellesville, Irondale, New Salisbury, Ohio, $100; Portsmouth, Ohio, $102; St. Louis, Mexico, Mo., $120; Lehi, Utah, $175.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $250; Danville, Ill., $253; Fords, N. J., Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., Frostburg, Md., $260; Troup, Tex., $265.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., Frostburg, Md., $320; Troup, Tex., Fords, N. J., Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., Frostburg, Md., $360; Troup, Tex., Fords, N. J., Philadelphia, $365.

Tar Bonded Brick (per ton)

Dolomite: Nario, Ohio, $87.50. Dolomite-Magnesite: Nario, Ohio, $109.50. Magnetite: Nario, Ohio, $128.

Sleeves (per 1000)

St. Louis, $193; Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310; Reesdale, Pa., $355.

Runners (per 1000)

Johnstown, Bridgeburg, St. Charles, Clearfield, Pa., $234; Reesdale, Pa., $245.

Dolomite (per ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Nario, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Mo., $15.60.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines, Chewelah, Wash., $46; minus ⅝ in., grains bulk, Luning, Nev., $46; ⅝ in. grains with fines (periclase), Baltimore, $73, Pascagoula, Miss., $90.

*—9 in. x 4½ x 2.50 straights.

Ores

Lake Superior Iron Ore

(Prices effective for the 1961 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi nonbessemer	$11.45
Mesabi bessemer	11.60
Old Range nonbessemer	11.70
Old Range bessemer	11.85
Open-hearth lump	12.70
High phos.	11.45

Based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1961; increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

New Jersey, concentrates ..... nom.

Foreign Iron Ore

Cents per unit

Swedish basic, 65%, c.i.f. Atlantic ports	25.00†
Chilean, 62-65%, c.i.f. Atlantic ports	22.00
Brazilian (lump), 68.5%, f.o.b. vessel, Victoria, per ton	$11.50

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$15.75-16.25*
Domestic, concentrates, f.o.b. milling points	22.00-23.00

Manganese Ore

Mn 46-48%, Indian, 85-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†

South African Transvaal

44% no ratio	18.75
48% no ratio	24.00-26.00†

Turkish

48% 3:1	35.00-37.00†

Domestic

Rail nearest seller

18% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.40

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard	
55-60%	$3.00-3.50
60-65%	3.60-4.00

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

*Before duty. †Nominal.

Canadian Steel

(Cents per lb, f.o.b. mill, except as otherwise noted)

Billets, Blooms & Slabs:	
Carbon (N.T.):	
Forging	$97.00
Rerolling	78.00
Alloy (N.T.)	115.00
Wire Rods:	
Carbon	5.70
Alloy	6.40
Wire (carload lots):	
Merchant annealed	8.40
Low carbon indus.	7.20
Upholstery spring	8.55
M.B. spring	8.85
Bars & Small Shapes:	
Carbon, merchant	5.30
Carbon, special	5.85
Alloy	6.40
Bar Mill Brands:	
Carbon	5.40
Alloy	8.05
Bars, Reinforcing	5.30
Structural Shapes:	
Standard carbon	5.50
Angles & zees	5.40
Plates, Carbon:	
Sheared	5.45
Universal mill	5.10
Sheets & Coils, Hot Rolled:	
Carbon sheet	4.95
Carbon strip	5.00
Sheets & Coils, Cold Rolled:	
Carbon sheet	6.35
Carbon strip:	
(0.080 and lighter)	6.35
(0.081 and heavier)	6.35
Sheets & Coils, Galvanized:	
Standard quality	6.70
Culvert quality	7.00
Sheets, Porcelain Enameling	7.45
Sheets & Coils, Electrical:	
Field grade	9.00
Electrical grade	10.15
Sheet Piling	6.15
Skelp	4.70
Rails, Heavy	5.55
Rails, Light	5.70
Joint Bars	6.55
Tie Plates	6.35
Grinding Balls (3 in. diam.)	7.00
Tin Mill (Per base box; **Products** 100 lb base wt)	
Coke tin plate (1.25 lb pot yield)	$10.60
Electrolytic tin plate (0.25 lb coating)	9.10
Black plate	8.30
Nails, Wholesale:	
Carload lots	Col. 110

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $29-$29.50; barge, Brownsville, Tex., $30-$31.

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted.)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85‡
40 mesh, bags	7.50††
Electrolytic Iron, Melting stock, 99.9% Fe, irreg. fragments, ⅛ in. x 1.3 in.	27.75
(In contract lots of 750 tons price is 22.75c.)	
Annealed, 99.5% Fe, .36.75, ton deld. east of Mississippi.	
Unannealed (99+% Fe)	33.0
Unannealed (99+% Fe) (minus 325 mesh)	58.0
Carbonyl Iron: 90-99.9%, 3 to 20 microns, depending on grade, $8.00-700.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 600-lb drum freight allowed, c.l. 39.80; ton lots	41.80
Brass, 80/20, leaded (60 mesh)	37.80
Bronze powder, 90/10.	56.80
Copper, all types	15.00*
Lead	7.50*
Manganese, 500 lb and up	25.00*
Nickel, all types	0.78-1.06
Nickel-Silver	56.00
Solder	7.00*
Stainless Steel, 304	89.00
Stainless Steel, 316	$1.07
Steel, AISI 4650	32.00
Tin	14.00*
Zinc	23.20

Cobalt:	Dollars
98.5%, minus 100-300 mesh	1.57-1.58
99.5%, below 5 microns	2.32
Molybdenum	4.35

*Plus cost of metal. ‡Depending on mesh. §Cutting and scarfing grades. **Depending on price of ore. ††Welding grade.

Metallurgical Coke

Price per net ton	
Beehive Ovens	
Connellsville, Pa. furnace	$14.75-15.25
Connellsville, Pa. foundry	18.00-18.50
Oven Foundry	
Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Chattanooga, Tenn., ovens	30.80
Detroit, ovens	32.00
Pontiac, Mich., deld.	34.05
Saginaw, Mich., deld.	35.63
Erie, Pa., ovens	32.00
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.64
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
New Haven, Conn., ovens	31.00
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.45
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.78
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.65	$5.70	$5.60	$5.50	$5.80
Bar Size Angles	5.85	5.90	5.80	5.70	6.00
Structural Angles	5.75	5.80	5.70	5.60	5.90
I-Beams	5.65	5.70	5.60	5.50	5.80
Channels	5.75	5.80	5.70	5.60	5.90
Plates (basic bessemer)	5.45	5.50	5.40	5.30	5.60
Sheets, hot rolled and galvanized	Nom.	....	Nom.	Nom.	Nom.
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	23.90	23.95	23.85	23.55	25.30
Barbed Wire (†)	6.25	6.30	6.20	6.10	6.40
Merchant Bars	5.95	6.00	5.90	5.80	6.10
Hot-Rolled Bands	5.95	6.00	5.90	5.80	6.10
Wire Rods, Thomas No. 5 (Niederrhein)	5.80*	5.90	5.75	5.75	6.00
Wire Rods, O.H., No. 5 (Niederrhein)	6.00*	6.10	5.95	5.95	6.20
Bright Common Wire Nails (§)	7.35	7.40	7.30	7.20	7.50

†Per 82 lb net reel. §Per 100-lb keg, 20d nails and heavier. *Except Boston.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.	
Pure benzene	34.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	6.00
Toluene, one deg. (deld. east of Rockies)	25.00
Cents per lb, f.o.b. tank cars or tank trucks, deld.	
Phenol, 90 per cent grade	14.75
Per ton bulk, f.o.b. cars or trucks, plant.	
Ammonium sulfate, regular grade	$32.00

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, 10 lb pigs, per gross ton, Palmerton, Pa., 21-23% Mn, $102.50; 19-21% Mn, 1-3% Si, $100; 16-19% Mn, $98. For Neville Island, Pa., prices add $2.50. Lump 35 lb and down: Deduct $2 from 10 lb pig prices at Palmerton.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $220, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Mn 79-81%). Lump $228 per net ton, f.o.b. Anaconda, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 4c for max 0.15% C grade from above prices, 5.3c for max 0.03% C, 6.6c for max 0.5% C, and 8.1c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 24c per lb of contained Mn; packed, carload 25.3c, ton lot of 26.9c, less ton 28.1c.

Electrolytic Manganese Metal: Min carload, bulk, 34.25c; 2000 lb to min carload, 37c; less ton, 39c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 11.6c per lb of alloy. Packed, c.l. 12.8c, ton 13.25c, less ton 14.25c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.2c from above prices. For 3% grade, Si 12.5-16%, deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 5% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.27, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.

Charge Chrome: Cr 58-65%, C 5-7%, Si 4-6%, S 0.03% max, 20.00c per lb of contained Cr, carlots, lump, bulk, delivered.

Blocking Chrome: Cr 55-63%, C 4-6%, Si 8-12%, 23.50c per lb of contained Cr, delivered in carlots, lump, bulk.

Refined Chrome: Cr 58-65%, C 4.25% max, Si 1.0% max, S 0.03%, 21.00c per lb of contained Cr, carlots, lump, bulk, delivered.

Low-Carbon Ferrochrome: (Simplex) Cr 63-66% or 68-71%: C 0.025% max, 31.50c; C 0.010% max, 32.50c per lb of contained Cr, carlots, lump, bulk, delivered.

Cr 68-73%; C 0.25% max, 33.00c. Cr 65-71%; C 0.05% max, 32.00c; C 0.10% max, 31.75c; C 0.20% max, 31.50c; C 0.50% max, 31.25c; C 1.0% max, 31.00c; C 1.5%, 30.75c; C 2.0% max, 30.50c, carlots, lump, bulk, delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25 max). 8M x D, carload, bulk, 20.05c per lb of alloy, carload packed 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max, 22.50c per lb contained Cr and 14.60c per lb contained Si; Cr 33-36%, Si 45-48%, C 0.05% max, 22.50c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (C 99.8% min, metallic basis Fe 0.2% max). Contract, carlot packed, 2" x D plate (above ¼" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5 freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 13.5c per lb contained Si. Packed, c.l. 16.0c, ton lot 17.45c, less ton 19.1c f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Chattanooga, Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.7% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lots, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk, 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). $2.45 per lb (all quantities) of contained W. Delivered.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload, $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3½ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 13.7c per lb of briquet; c.l. packed, bags 14.9c; 3000 lb to c.l., pallets 14.9c; 2000 lb to c.l., bags 16.1c; less ton 17c. Delivered. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 14c per lb briquet; c.l. packed, bags 15.2c; 3000 lb to c.l., pallets 15.2c; 2000 lb to c.l., bags 16.4c; less ton 17.3c. Delivered. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.60 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 4% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 44-47% approx, Ta 15% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots, $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carload, bulk 19.25c per lb of alloy, c.l. packed ½ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l., packed 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

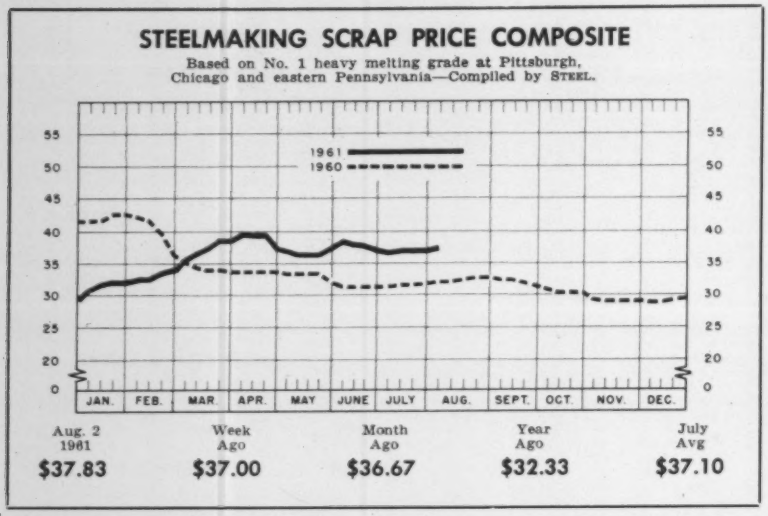
V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Siminal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk, 19.25c. Packed c.l. 20.25c; 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (65-70%). Per lb of contained Mo in 2000-lb container, f.o.b. Langeloth and Washington, Pa., $1.89 in all sizes except powdered which is $1.95.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans $1.60; in bags, $1.59, f.o.b. Langeloth and Washington, Pa.



Scrap Prices Rise on Light Sales

STEEL's index on No. 1 heavy melting grade advances 83 cents a ton to $37.83, a new high since June 21. Strength is attributed to light generation and good export demand

Scrap Prices, Page 114

● **Chicago** — Open hearth grades have advanced $1 to $2 a ton. The revisions were sparked by winning bids on 6000 tons of No. 1 factory bundles to be produced this month by an auto body stamper. At $39.91, on track, the bids were about $1.30 higher than those a month ago. With a $2.50 a ton switching charge, the mill delivered price would be about $42.50 without brokerage fee. Last sales had been at $42 a ton.

Another development bolstering the market was the announcement by a district mill that its buying price for No. 1 industrial heavy melting scrap returned by its customers would be $39.50 a ton, up $1.50 over the price a month ago.

Prospects for steelmaking during the next month or so do not support rising prices.

● **Philadelphia** — Scrap prices remain fairly strong here, with No. 1 heavy melting steel up $1 a ton to $40, delivered. Low phos structurals and plates are also up $1 for the second consecutive week to $44-$46.

District mills have inched up requirements. Export demand, while less pressing, is still taking a considerable tonnage. New Jersey pipe mills have covered on their major cast scrap requirements for August on the unchanged basis of $40, delivered, for No. 1 cupola.

● **New York** — Brokers' buying prices are unchanged. Except for an advance in low phos a week ago, there has been no change in prices for the active grades over the last few weeks. Borings and turnings remain weak and nominal.

● **Pittsburgh**—Although bids on No. 1 factory bundles from an automotive stamping plant were surprisingly high (up $3 a ton from last month's), the market is generally static. Brokers for a mill on the fringe of the district bought No. 1 heavy melting at a price equivalent to $36 a ton, delivered Pittsburgh. The same price was paid last month.

● **Youngstown** — A major district steel producer has placed an order for No. 1 heavy melting industrial scrap at $41 per gross ton, the same price it paid on a previous order and some $3 per ton over the nominal price for dealer scrap.

● **Buffalo**—District mills have announced they will do little buying of scrap for August delivery. The largest consumer indicates it will take nothing during the month, except for limited tonnages of turnings. Two smaller mills also will buy little because of the low steelmaking operating schedule.

Dealers had counted on some mill business in August and are disappointed. Consumer prices remain unchanged despite the lack of orders.

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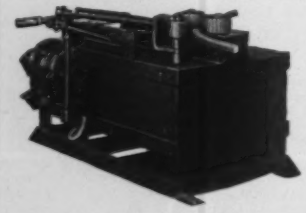

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Consumers are exerting no pressure for lower prices, although dealers are trying to buy for less.

Sales of cast scrap have been made recently at prevailing levels.

• **St. Louis**—The stronger tone in the scrap market continues. A slight rise in prices has started. Stove plate has moved up $1 a ton to $33; No. 1 railroad heavy melt, $1 to $36 a ton.

Scrap is pretty well in balance but not in oversupply. Some scrap is still moving to export via New Orleans. The volume of scrap business here is about normal.

• **Birmingham**—Dealers and brokers here believe the August price level, when it firms up, "will not be any lower than it was in July." One mill has held up shipments of some No. 1 bundles and No. 1 heavy melting steel scrap until later in the month.

• **Houston**—A generally stable market is expected this month. Mill inventories are high and shipments on current orders are moving well. Export demand is slow in Houston and sporadic in other Gulf ports. Mexican demand for Texas scrap is light. Over-all, the tapering demand is matched by the normally slow, seasonal intake. Cast iron prices are unchanged with the undertone weak due to slow sales.

• **San Francisco**—Brokers and dealers look for no major price change in the steel scrap market during August.

• **Los Angeles** — The light movement in scrap which featured July business is expected to continue through August. Although export demand has tapered, higher prices are quoted on top grades which are in short supply. That applies particularly to No. 1 heavy melting. Dealers are speculating on domestic prices, awaiting a resurgence of foundry and mill demand.

Iron Ore Statistics — June, 1961

(Gross tons)

	U. S. Iron Ores		Canadian Ores		Foreign	
	L. Sup.	Other	L. Sup.	Other	Ores	Total
At Furnace Yards						
Start of Month	25,883,022	3,336,919	1,240,799	2,903,380	16,898,293	50,262,413
End of Month in:						
Mass., N. Y.	2,144,808	23,864	59,009	171,184	299,171	2,698,036
Pennsylvania	5,860,793	399,541	21,563	71,003	8,025,000	14,377,900
Md., Va., W. Va.	511,665	7,479	.....	1,224,035	2,656,717	4,399,896
Ky., Tenn., Tex.	289,780	160,729	.....	181,617	76,646	708,772
Alabama	871	1,706,314	.....	108,025	3,639,181	5,454,391
Ohio	7,502,224	20,601	615,583	1,400,142	1,262,238	10,800,788
Indiana	6,018,408	28,579	343,098	45	52,680	6,442,810
Illinois	3,705,562	55,189	19,529	.....	216,783	3,997,063
Mich, Minn.	2,718,672	.....	243,669	22,853	283,549	3,268,743
Colo., Utah, Calif.	.....	856,378	.....	.....	10,991	867,369
Undistributed	445	2,346	.....	.....	554	3,345
End of Month Total	28,753,228	3,261,020	1,302,451	3,530,689	16,523,510	53,019,113
At U. S. Docks	2,652,751	.....	215,327	901,020	2,354,890	6,114,866
Total U. S.	31,405,979	3,261,020	1,517,778	4,431,709	18,878,400	59,133,979
In Canada	1,780,725	.....	78,451	254,066	63,626	2,161,864
Total U. S.-Canada	33,186,704	3,261,020	1,596,229	4,685,775	18,942,026	61,295,843

Consumption of Iron Ore—June, 1961

(Gross tons)

	U. S. Iron Ores		Canadian Ores		Foreign	
	L. Sup.	Other	L. Sup.	Other	Ores	Total
In U. S.						
Mass., N. Y.	396,417	26,352	21,601	11,589	39,165	495,124
Pennsylvania	794,473	277,989	2,282	49,982	651,071	1,775,797
Md., Va., W. Va.	120,804	14,682	.....	278,028	367,377	780,891
Ky., Tenn., Tex.	42,110	80,233	.....	55,216	29,619	207,178
Alabama	.....	346,843	.....	6,589	180,068	533,500
Ohio	1,079,291	5,919	57,534	106,810	136,309	1,385,863
Indiana	1,187,953	.....	104,209	979	15,779	1,308,920
Illinois	612,052	32,438	14,541	.....	35,327	649,358
Mich., Minn.	528,521	337	66,636	19,946	51,446	666,886
Colo., Utah, Calif	.....	659,166	.....	.....	1,029	696,195
Undistributed	115	51	.....	.....	89	255
In U. S.						
Blast furnaces	3,158,039	984,667	128,547	198,816	473,852	4,943,921
Steel furnaces	132,792	56,146	26,529	14,464	415,278	645,209
Sintering	1,470,829	439,197	111,727	315,859	618,149	2,955,761
Miscellaneous	76	.....	.....	.....	.....	76
Total U. S.	4,761,736	1,480,010	266,803	529,139	1,507,279	8,544,967
In Canada						
Blast furnaces	244,819	.....	15,285	96,829	4,495	341,428
Steel furnaces	.....	.....	.....	25,264	11,221	36,485
Sintering	93,176	.....	89,973	35,577	.....	216,726
Miscellaneous	.....	.....	.....	.....	.....	.....
Total Canada	317,995	.....	105,258	155,670	15,716	594,639
Total U. S.-Canada	5,079,731	1,480,010	372,061	684,809	1,522,995	9,139,606

Data from the American Iron Ore Association.

Scrap Exports Set Record

Exports of scrap soared to an all-time monthly high in May (959,000 gross tons), reports the Institute of Scrap Iron & Steel, Washington. It pushed the tonnage for the first five months to 3,480,000 tons compared with 2,270,000 tons for the like 1960 period. The increase is attributed to low prices on domestic scrap and the availability of considerable amounts of the most popular export grades.

Continued interest in export trade

U. S. GOV'T SURPLUS

STEEL FOUNDRY

Located in San Francisco Bay Area Industrial tract between Pittsburg and Antioch, California
Formerly Pacific Ordnance Steel Foundry

SEALED BID OPENING SEPTEMBER 13, 1961 (3:00 P. M. PDT)

★ Ready to operate Steel Foundry consisting of 31-Foundry, Utility and Admistrative buildings on approximately 41.146 acres. Buildings and equipment maintained in a "ready status." ★ Strategically located in rich, Pittsburg-Antioch Industrial Area and adjacent to existing Columbia-Geneva Steel Mill, Shell Chemical Co., U. S. Steel, Linde Air Products, Pacific Gas & Electric, etc. ★ 50 minutes from San Francisco-Oakland Bay Area with easy access via State routes #24 and #4. Proposed freeway will link area with Oakland within a few years. ★ Adequate existing residential area housing industrial workers nearby . . . new residential sub-divisions developing rapidly. ★ Served by Santa Fe Railroad spur track. Located near shipping channels. ★ Attractive Financing.

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SINCE 1873

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, Aug. 2, 1961. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Aug. 2	$37.83
July 26	37.00
July Avg.	37.10
Aug. 1960	32.33
Aug. 1956	57.13

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	28.00-29.00
No. 1 dealer bundles	36.00-37.00
No. 2 bundles	23.00-24.00
No. 1 busheling	35.00-36.00
No. 1 factory bundles	*46.00-47.00*
Machine shop turnings	14.00-15.00
Mixed borings, turnings	14.00-15.00
Short turnings	19.00-20.00
Cast iron borings	18.00-19.00
Cut structurals:	
2 ft and under	42.00-43.00
3 ft and under	39.00-40.00
Heavy turnings	27.00-28.00
Punching & plate scrap	43.00-44.00
Electric furnace bundles	43.00-44.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	34.00-35.00
Stove plate	34.00-35.00
Unstripped motor blocks	24.00-25.00
Clean auto cast	35.00-36.00
Drop broken machinery	45.00-46.00§

Railroad Scrap

No. 1 R.R. heavy melt.	40.00-41.00
Rails, 2 ft and under	50.00-51.00
Rails, 18 in. and under	51.00-52.00
Random rails	45.00-46.00
Angles, splice bars	44.00-45.00
Railroad specialties	45.00-46.00
Rails, rerolling	59.00-60.00

Stainless Steel Scrap

18-8 bundles & solids	180.00-185.00
18-8 turnings	105.00-110.00
430 bundles & solids	85.00-90.00
410 turnings	50.00-55.00

CHICAGO

No. 1 hvy melt., indus.	*39.00-40.00*
No. 1 hvy melt., dealer	*36.00-37.00*
No. 2 hvy melting	*31.00-32.00*
No. 1 factory bundles	*42.00-43.00*
No. 1 dealer bundles	*38.00-39.00*
No. 2 bundles	*22.00-23.00*
No. 1 busheling, indus.	*39.00-40.00*
No. 1 busheling, dealer	*36.00-37.00*
Machine shop turnings	15.00-16.00
Mixed borings, turnings	17.00-18.00
Shovel turnings	17.00-18.00
Cast iron borings	17.00-18.00
Cut structurals, 3 ft	43.00-44.00
Punchings & plate scrap	44.00-45.00

Cast Iron Grades

No. 1 cupola	*42.00-43.00*
Stove plate	*37.00-38.00*
Unstripped motor blocks	33.00-34.00
Clean auto cast	*47.00-48.00*
Drop broken machinery	*47.00-48.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*40.00-41.00*
R.R. malleable	47.00-48.00
Rails, 2 ft and under	49.00-50.00
Rails, 18 in. and under	50.00-51.00
Angles, splice bars	44.00-45.00
Axles	56.00-57.00
Rails, rerolling	58.00-59.00

Stainless Steel Scrap

18-8 bundles, solids	185.00-190.00
18-8 turnings	105.00-110.00
430 bundles & solids	90.00-95.00
430 turnings	50.00-55.00

BUFFALO

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	26.00-27.00
No. 1 bundles	31.00-32.00
No. 2 bundles	24.00-25.00
No. 1 busheling	31.00-32.00
Shovel turnings	17.00-18.00
Machine shop turnings	13.00-14.00
Cast iron borings	15.00-16.00
Low phos. structurals and plates, 2 ft and under	39.00-40.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	37.00-38.00
No. 1 machinery	44.00-45.00

Railroad Scrap

Rails, random lengths	42.00-43.00
Rails, 3 ft and under	48.00-49.00
Railroad specialties	41.00-42.00
Rails, rerolling	63.50-64.50

CLEVELAND

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	24.00-25.00†
No. 1 factory bundles	42.00-43.00
No. 1 bundles	35.00-36.00
No. 2 bundles	23.00-24.00†
No. 1 busheling	35.00-36.00
Machine shop turnings	12.00-13.00
Shovel turnings	16.00-17.00
Mixed borings, turnings	16.00-17.00
Cast iron borings	16.00-17.00
Cut foundry steel	30.00-33.00
Cut structurals, plate, 2 ft and under	*41.00-42.00*
Low phos, punchings & plate	37.00-38.00
Alloy free, short shovel turnings	18.00-19.00
Electric furnace bundles	37.00-38.00

Cast Iron Grades

No. 1 cupola	39.00-40.00
Charging box cast	26.00-27.00
Heavy breakable cast	28.00-29.00
Stove plate	36.00-37.00
Unstripped motor blocks	31.00-32.00
Brake shoes	37.00-38.00
Clean auto cast	47.00-48.00
Burnt cast	32.00-33.00
Drop broken machinery	48.00-49.00

Railroad Scrap

R.R. malleable	47.00-48.00
Rails, 2 ft and under	48.00-49.00
Rails, random lengths	44.00-45.00
Rails, 18 in. and under	49.00-50.00
Cast Steel	41.00-42.00
No. 1 railroad cast	48.00-49.00
Railroad specialties	43.00-44.00
Angles, splice bars	44.00-45.00
Rails, rerolling	55.00-56.00

Stainless Steel Scrap (Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	160.00-165.00
18-8 turnings	95.00-100.00
430 clips, bundles, solids	80.00-85.00
430 turnings	15.00-25.00†

YOUNGSTOWN

No. 1 heavy melting	38.00-39.00
No. 2 heavy melting	25.00-26.00†
No. 1 busheling	39.00-40.00
No. 1 bundles	40.00-41.00
No. 2 bundles	25.00-26.00†
Machine shop turnings	14.00-15.00†
Shovel turnings	19.00-20.00†
Cast iron borings	19.00-20.00†
Low phos.	41.00-42.00
Electric furnace bundles	41.00-42.00

Railroad Scrap

No. 1 R.R. heavy melt.	40.00-41.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*33.00-34.00*
No. 2 heavy melting	*28.00-29.00*
No. 1 bundles	*34.00-35.00*
No. 2 bundles	*20.50-21.50*
No. 1 busheling	*33.00-34.00*
Machine shop turnings	9.00-10.00
Mixed borings, turnings	11.00-12.00
Shovel turnings	12.00-13.00
Cast iron borings	11.00-12.00
Low phos. 18 in.	*40.00-41.00*

Cast Iron Grades

No. 1 cupola	34.00-35.00
Heavy breakable cast	28.00-29.00
Charging box cast	34.00-35.00
Drop broken machinery	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	36.00-37.00
Rails, 18 in. and under	47.00-48.00
Rails, random lengths	41.00-42.00

ST. LOUIS (Brokers' buying prices)

No. 1 heavy melting	34.00
No. 2 heavy melting	29.00
No. 1 bundles	35.00
No. 2 bundles	24.00
No. 1 busheling	34.00
Machine shop turnings	*13.50*
Shovel turnings	*16.00*

Cast Iron Grades

No. 1 cupola	37.00
Charging box cast	34.00
Heavy breakable cast	32.00
Unstripped motor blocks	34.00
Clean auto cast	38.00
Stove plate	*33.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*36.00*
Rails, random lengths	39.00
Rails, rerolling	55.00
Rails, 18 in. and under	44.00†
Angles, splice bars	40.00†

PHILADELPHIA

No. 1 heavy melting	*40.00*
No. 2 heavy melting	35.00
No. 1 bundles	43.00
No. 2 bundles	24.00-26.00
No. 1 busheling	43.00
Electric furnace bundles	44.00
Mixed borings, turnings	17.00†
Shovel turnings	20.00
Machine shop turnings	14.00
Heavy turnings	25.00†
Structurals & plates	*44.00-46.00*
Couplers, springs, wheels	44.00-45.00
Rail crops, 2 ft & under	51.00-53.00

Cast Iron Grades

No. 1 cupola	40.00
Heavy breakable cast	40.00
Drop broken machinery	49.00-50.00†
Malleable	49.00†

NEW YORK (Brokers' buying prices)

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	23.00-24.00
No. 1 bundles	30.00-31.00
No. 2 bundles	20.00-21.00
Machine shop turnings	4.50-5.00†
Mixed borings, turnings	5.00-5.50†
Shovel turnings	6.00-7.00†
Low phos. structurals & plates	34.00-35.00

Cast Iron Grades

No. 1 cupola	34.00-35.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	31.00-32.00

Stainless Steel

18-8 sheets, clips, solids	155.00-160.00
18-8 borings, turnings	70.00-75.00
410 sheets, clips, solids	40.00-45.00
430 sheets, clips, solids	55.00-60.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	28.50-29.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	28.00-29.00
No. 1 busheling	28.50-29.00
Machine shop turnings	5.00-6.00
Shovel turnings	9.00-9.50
No. 1 cast	39.00-40.00
Mixed cupola cast	32.00-33.00
No. 1 machinery cast	40.00-42.00

DETROIT (Brokers' buying prices)

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	35.00-36.00
No. 2 bundles	23.00-24.00
No. 1 busheling	31.00-32.00
Machine shop turnings	10.00-11.00
Mixed borings, turnings	11.00-12.00
Shovel turnings	12.00-13.00

Cast Iron Grades

No. 1 cupola	32.00-33.00
Mixed cast	30.00-31.00
Stove plate	27.00-28.00
Heavy breakable	26.00-27.00
Unstripped motor blocks	22.00-23.00
Clean auto cast	39.00-40.00

Stainless Steel Scrap

18-8 bundles & solids	170.00-175.00
18-8 turnings	70.00-75.00
430 bundles & solids	70.00-75.00
430 turnings	11.00-12.00

BIRMINGHAM

No. 1 heavy melting	37.50-38.50
No. 2 heavy melting	29.00-30.00
No. 1 bundles	37.50-38.50
No. 2 bundles	21.00-22.00
No. 1 busheling	38.00-39.00
Cast iron borings	10.00-11.00
Machine shop turnings	18.00-19.00
Shovel turnings	20.00-21.00
Bar crops and plate	43.00-44.00
Structurals & plate	42.00-43.00
Electric furnace bundles	38.00-39.00
Electric furnace:	
3 ft and under	36.00-37.00
2 ft and under	37.00-38.00

Cast Iron Grades

No. 1 cupola	*41.00-42.00*
Stove plate	42.00-43.00
Unstripped motor blocks	31.00-32.00
No. 1 wheels	*34.00-35.00*

Railroad Scrap

No. 1 R.R. heavy melt.	38.00-39.00
Rails, 2 ft and under	46.00-47.00
Rails, random lengths	41.00-42.00
Angles, splice bars	44.00-45.00

HOUSTON

(Brokers' buying prices; f.o.b. car)

No. 1 heavy melting	35.00
No. 2 heavy melting	31.00-32.00
No. 1 bundles	35.00-36.00
No. 2 bundles	21.00-22.00
Machine shop turnings	10.00-11.00
Low phos. plate & structurals:	
3 ft	38.00-39.00
2 ft and under	43.00-44.00

Cast Iron Grades

No. 1 cupola	38.00-39.00
Heavy breakable	26.00-27.00
Foundry malleable	30.00-31.00
Unstripped motor blocks	31.00-32.00

Railroad Scrap

R.R. heavy melt. (3 ft)	37.00-38.00

LOS ANGELES

No. 1 heavy melting	*40.00-41.00*
No. 1 hvy melt (export)	*42.00-44.00*
No. 2 heavy melting	*37.00-39.00*
No. 2 hvy. melt (export)	*41.00*
No. 1 bundles	*34.00-35.00*
No. 2 bundles	*26.00-28.00*
No. 2 bundles (export)	*28.00-30.00*
Machine shop turnings	15.00-17.00
Shovel turnings	15.00-17.00
Cast iron borings	16.00-17.00
Electric furnace scrap	50.00

Cast Iron Grades

No. 1 cupola	44.00-46.00

Railroad Scrap

No. 1 R.R. heavy melt.	*43.00-45.00*

PORTLAND, OREG.

(Prepared, f.o.b. car)

No. 1 heavy melting	44.00-45.00
No. 2 heavy melting	41.00-42.00
No. 2 bundles	31.00
Shovel turnings	18.00
Electric furnace	54.00

Cast Iron Grades

No. 1 cupola	42.00
Heavy breakable	38.00
Unstripped motor blocks	39.00
Stove plate (f.o.b. plant)	37.00

SEATTLE (Prepared, f.o.b. car)

No. 1 heavy melting	44.00-45.00
No. 1 hvy (unprepared)	39.00
No. 2 heavy melting	41.00-42.00
No. 2 hvy (unprepared)	36.00
No. 2 bundles	31.00
Shovel turnings	16.00-18.00
Electric furnace	52.00

Cast Iron Grades

No. 1 cupola	42.00
Heavy breakable cast	39.00
Stove plate (f.o.b. plant)	37.00
Unstripped motor blocks	39.00

SAN FRANCISCO

No. 1 heavy melting	43.00**
No. 2 heavy melting	40.00**
No. 1 bundles	34.00**
No. 2 bundles	28.00**
Machine shop turnings	18.00
Mixed borings, turnings	18.00
Cast iron borings	18.00
Heavy turnings	18.00
Shovel turnings	18.00

Cast Iron Grades

No. 1 cupola	46.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	45.00-46.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices; net tons)

No. 1 heavy melting	31.00
No. 2 hvy melt, 2 ft & under	30.00
No. 1 bundles	31.00
No. 2 bundles	23.50
Mixed steel scrap	23.00
Mixed borings, turnings	12.00
Busheling, new factory:	
Prepared	31.00
Unprepared	25.00
Shovel turnings	12.00

Cast Iron Grades‡

No. 1 machinery cast	32.00

**Based mainly on export sales.
†Nominal.
‡F.o.b. Hamilton, Ont.
§Delivered.

is reflected in 778,000 tons licensed for export during June.

Purchased scrap consumption by domestic mills in May was estimated at 2,214,000 tons, the highest total since March and the fourth straight month in which consumption increased. Daily use was 71,400 tons in May, well above April's rate of 65,500 tons and March's 59,800.

The proportions of scrap and pig iron used in May's total charge showed a pronounced change from those of the previous eight months. In May, the amounts were equal vs. 52 to 48 per cent ratio, in favor of scrap, during the earlier period.

Steel mill stocks of home and purchased scrap continued to decline steadily from the high of 11 months ago. The total was 6,093,000 tons at the end of May, down from the revised total of 6,413,000 tons at the end of April.

Wire . . .

Wire Prices, Pages 106 & 107

Wire mill bookings are slightly heavier for early delivery, but forward buying remains slow. Little tonnage for fourth quarter delivery is being entered.

Shipment on numerous industrial grades is not as prompt as might be expected. Producers are reluctant to schedule production for short runs that would increase costs.

Spring wire inquiry is starting to perk up. Depot Quartermaster, Richmond, Va., closes Aug. 14 on 850,000 helical springs.

Steel Bars . . .

Bar Prices, Page 104

Bar consumers are not buying for inventory, but orders for prompt shipment and current consumption are up slightly. Hot rolled carbon bars are being offered for delivery within two to four weeks.

Cold rolled carbon bars are moving a trifle better with shipment readily available on standard sizes. F. J. Robbins, president, Bliss & Laughlin Inc., Harvey, Ill., made this comment about cold finished bars: "Our customers, being a bit more optimistic, are buying more in their standard pattern. Because of auto model changeovers and summer vacations, we expect a moderate drop in . . . August production, but believe September and the balance of the year will show an appreciable upturn."

Hot and cold finished alloy bar business is more active than it was, but substantial gains will hinge on buying by automotive industry.

In New England, stocks of most users are low and will continue that way until deliveries begin to lengthen. Small arms account for most of the larger orders. Jones & Laughlin Steel Corp., Pittsburgh, booked 289 tons of 1 23/32 in. squares, hot rolled alloy, Grade 8620H gun quality, for the Springfield, Mass., Arsenal.

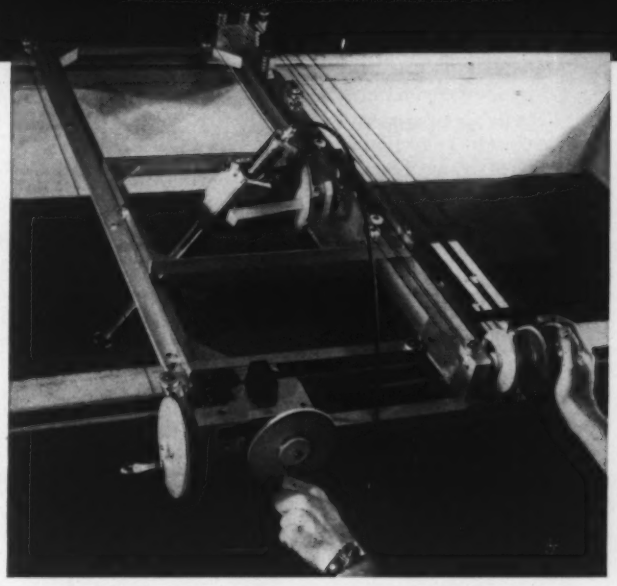
Pig Iron . . .

Pig Iron Prices, Page 109

American Motors Corp. closed its foundry at Kenosha, Wis., "pending a study of our future foundry approaches. As we move increasingly to new techniques in both aluminum and iron engine production, we want flexibility," the firm said. Lacking a foundry facility within the company, American Motors will have to obtain castings for its 1962 models from outside suppliers.

SCANNING BRIDGE

The Robot hands for ultrasonic flaw detection!



This "tailor-made" scanning bridge is used with the SONORAY® flaw detector. It holds the transducer in the required position and also permits its adjustment. The transducer may be raised or lowered, tilted in 2 planes or moved to any position in the tank.

Salient features:

- Ease of Operation (all controls are on one side and close to the operator)
- High-Accuracy Positioning • Light in Weight, but sturdy • Economy Priced

The scanning bridge is merely one of many outstanding examples of BRANSON ingenuity. This bridge was designed with the customer in mind! It was well-engineered at the lowest possible cost. The next time you have a problem, call BRANSON and see how fast BRANSON will find the best solution in the shortest possible time.

SINCE 1946 — THE RESPECTED NAME IN ULTRASONICS

BRANSON INSTRUMENTS, INC.

Ultrasonic Test Division

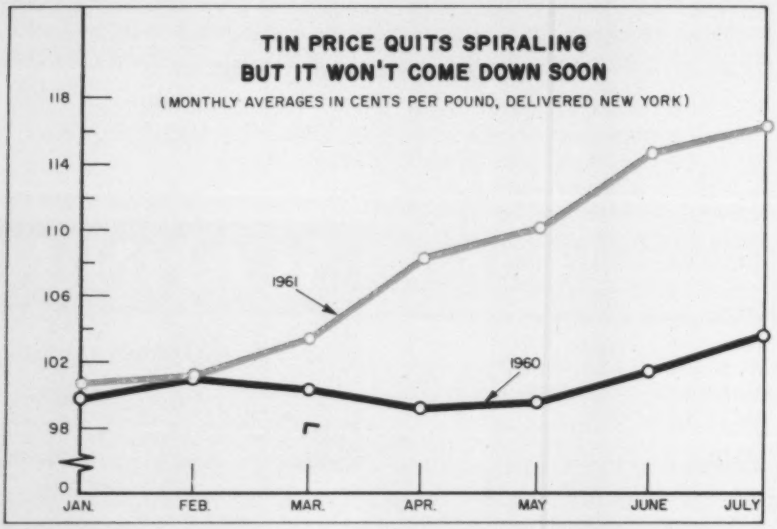
36 Brown House Road, Stamford, Conn.

Time Coming for Decisions on Tin

Nonferrous Metal Prices, Pages 118 & 119

DESPITE its outward calm, the tin market is jumpy. The frenzied activity of buyers and sellers has eased. But underneath are strong pressures that may force early decisions on two important questions: 1. Should the U. S. dispose of some of its strategic stockpile of tin to ease the supply and price pressures? 2. Should the U. S. join the International Tin Agreement (ITA)? Outside the Red Bloc countries, we're the only major nation that doesn't belong.

Major consumers are worried by the excess of demand over supply that seems to be shaping up, despite some statements that have been made for public consumption. They don't like what has happened to the tin price. (It has climbed from $1 a pound early in the year to $1.17.)



Compiled by STEEL.

• **Asking Stockpile Release**—A quiet move is underway to get government to release some of the tin held in the national stockpile. A letter from the American Iron & Steel Institute to Commerce Secretary Hodges reads in part: "We suggest early consideration by the Department of Commerce of steps to initiate the Congressional and Presidential action necessary to facilitate prompt and orderly release of strategic stockpile tin if or when requested. Even if such action is started at an early date, several months will likely be required before decisions are reached."

Two factors are of significance in the AISI letter: First is the seriousness with which the steel industry views a possible future tin shortage. Second is the wide ranging effect a favorable reaction by the government could have. Here's why: A tin disposal program would mark the first time any metal in the strategic stockpile has been released to the public. It's no secret that many commodities in the stockpile are in excess of revised defense requirements and that some highly placed officials would like nothing better than to trim the surpluses.

• **Huge Stocks** — The law makes provision for disposal upon the approval of the administration (the Commerce, Interior, State, Agriculture, and Defense Departments) and of the Congress. The amount of tin in the strategic stockpile is classified, but educated guesses indicate there is enough metal to satisfy U. S. needs for six to eight years. The release of modest tonnages would stablize prices (at lower than the current level) and insure users of an adequate supply, reason consumers.

Stockpile disposal would probably be more difficult than the wording of the law indicates. One hint is the dillydallying that has taken place in the sale of the 3933 tons of metal in a special General Services Administration stockpile. It was acquired when the government's Texas City, Tex., smelter was sold several years ago. No special legislation is required for its disposal. Consumers and some producers have been pressuring the government to release this metal to the market, and both State and Commerce Departments have given the green light for its disposal, but only 500 tons have been released. The remainder is still at Warren, Ohio.

• **Poll on ITA**—Late last month, a group representing the steel companies, canners, traders, and smelters met with administration officials at the Commerce Department. Most of the conversation centered on whether the U. S. should join the International Tin Agreement. In an informed poll, the delegates voted this way: Eight said "No." Five said "No position." Four said "No comment." One said "Yes." There's even a division of opinion within some companies. The government hasn't stated an official position, though some insiders believe it favors membership.

The ITA is an organization of governments set up to stabilize tin prices and production. U. S. membership wouldn't require special legislation. It would be by multilateral treaty and require ratification by the Senate, as does any other treaty.

That's where the rub comes in, say opponents. Membership would give the ITA a voice in any disposal of U. S. tin stocks and possibly other internal matters involving the metal. Proponents say that membership would make it virtually impossible for a rumor to disrupt the world market, that speculative activity

would be severely limited, and that it would show our good faith toward underdeveloped nations that are major producers.

• **The Crux**—One thing is certain: The tin market has undergone a basic change which has brought problems. The job is to find the answers. Perhaps an upcoming meeting at the Commerce Department will point the direction.

U. S. Beryllium Corp. Increasing Ore Production

U. S. Beryllium Corp., Pueblo, Colo., has stepped up ore production to meet growing industrial demand. The company is daily supplying 1 ton of 8 per cent and higher beryllium oxide (BeO) content ores to the Loveland, Colo., mill of Mineral Concentrates & Chemical Co. (Mincon), Denver. This is preliminary to a full expansion program that will be underway in September.

In addition to the shipments of high grade beryllium ores, the company is continuing its program of stockpiling middle and low grade beryllium ores. They are for Mincon's concentrating plant being constructed on Badger Flats, west of Pikes Peak, Colo. The plant is designed for a daily capacity of 100 tons.

The concentrating plant will utilize an inexpensive water flotation process which can upgrade U. S. Beryllium's ores to as high as 33 per cent BeO content.

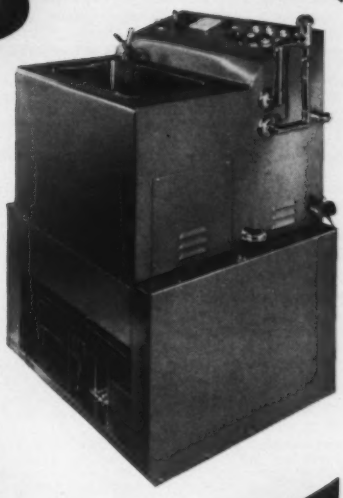
Tubular Goods . . .

Tubular Goods Prices, Page 108

An automated tube mill with a monthly capacity of more than 2 million ft of welded tubing is being installed at the Union, N. J., plant of Shapeweld Div., Solar Steel Corp. It is scheduled to begin operations Aug. 15. Capable of continuous operation by use of looping equipment, the Yoder mill can produce 50,000 ft of tubing per shift in diameters to 2.5 in. and wall thicknesses up to 0.093 in.

Seamless pipe business is good, but other pipe business is not holding up, says a sales executive at Youngstown Sheet & Tube Co., Youngstown. Similar reports are re-

CLEANING *Specialists* FOR AMERICAN INDUSTRY



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Industrial Washers

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, 50 lb ingots, 26.00, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 25.90; No. 43, 26.20; No. 195, 27.60; No. 214, 29.00; No. 356, 26.80, 50 lb ingots.

Antimony: R.M.M. brand, 95.5%, 32.50; Lone Star brand, 33.00, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 30.50-31.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $70.00 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $65 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 99+%, $1.50 per lb for 500-lb keg; $1.52 per lb for 100 lb case; $1.57 per lb under 100 lb.

Columbium: Powder, $55 per lb and up nom.

Copper: Electrolytic, 31.00 deld; custom smelters, 31.00 nom; lake, 31.00 deld; fire refined, 30.75 deld.

Germanium: Purified, ingots, less than 1 kg 37.50 per gram; 1-10 kg 32.00 per gram; 10 kg or more, 29.95 per gram; intrinsic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-75 per troy oz nom.

Lead: Common, 10.80; chemical, 10.90; corroding, 10.90; St. Louis, New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 24 lb, $11 per lb deld; 24-99 lb, $9.50; 100-449 lb, $9.25; 450 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex., 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75 f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $188-191 per 76 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-8.5 in. diam., 50-4999 lb, $8.15 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, briquettes, sheets (4 x 4 in. and larger), unpacked, 81.25; 10-lb pigs, unpacked, 89.00; "XX" nickel shot, 88.75; "F" nickel shot for addition to cast iron, in kegs, 81.75; "F" nickel, 5 lb ingots, 82.75. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.09; Exton, Pa., basis, add 1.60. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel 77.50.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $6.50-7 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; 5 and 12 lb bricks, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom; sheet, $55 per lb nom.

Tellurium: $5.25 per lb, 100 lb or more.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 116.50.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 100-lb lots, $2.75 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00c; 99+% hydrogen reduced, $3.25.

Zinc: Prime Western, 11.50; brass special 11.70; intermediate, 11.70. East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 12.35; special high grade, 12.50 deld. Diecasting alloy ingot No. 3, 13.75; No. 2, 14.25; No. 5, 14.00 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8-8.50 per lb; 100-500 lb, $7.25-7.50 per lb; 500-1000 lb, $6.50-7.25; over 1000 lb, $6.50 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 24.25-26.00; No. 12 foundry alloy (No. 2 grade), 21.75-22.25; 5% silicon alloy, 0.60 Cu max, 23.50-24.00; 13 alloy, 0.60 Cu max, 23.50-24.00; 195 alloy, 24.75-25.75; 108 alloy, 22.25-22.75. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.25; grade 2, 22.00; grade 3, 21.00; grade 4, 20.00.

Brass Ingot: Red brass, No. 115, 32.00; tin bronze, No. 225, 41.25; No. 245, 35.75; high leaded tin bronze, No. 305, 36.00; No. 1 yellow, No. 405, 27.50; manganese bronze, No. 421, 31.25.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.955, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.955, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 36.35; l.c.l., 36.98. Weatherproof 20,000-lb lots, 37.05; l.c.l., 37.80.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $16.50 per cwt; pipe, full coils, $16.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $6.75-15.50; sheared mill plate, $5.25-9.00; wire, $5.55-9.50; forging billets, $3.20-4.75; hot-rolled and forged bars, $3.80-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $14.00-25.00; H.R. strip, $14.00-22.90; C.R. strip, $16.00-35.00; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	147	126	145
Strip, C.R.	133	114	145
Plate, H.R.	134	116	133
Rod, Shapes, H.R.	116	95	116
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base f.o.b. customer custody.

Thickness Range (in.)	Width (in.)	Length Range (in.)	Price Range
0.250-0.136	24-72	72-180	45.40-48.00
0.136-0.096	24-72	72-180	45.90-48.80
0.096-0.077	24-72	72-180	46.40-50.30
0.077-0.068	24-72	72-180	46.90-52.10
0.068-0.061	24-72	72-180	46.90-55.00
0.061-0.048	24-72	72-180	47.40-57.70
0.048-0.038	24-72	72-180	47.90-60.50
0.038-0.030	24-72	72-180	48.40-65.30
0.030-0.024	24-72	72-180	48.90-67.20
0.024-0.019	24-60	72-180	49.40-59.90
0.019-0.017	24-48	72-144	50.30-57.00
0.017-0.015	24-48	72-144	51.20-58.00
0.015-0.014	24-36	72-144	52.30
0.014-0.012	24-36	72-144	53.50
0.012-0.011	24-36	72-144	54.60
0.011-0.0095	24-46	72-144	56.20
0.0095-0.0085	24-36	72-96	57.50
0.0085-0.0075	24-36	72-96	59.20
0.0075-0.007	24-36	72-96	60.80
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates and Circles: Thickness, 0.25-3 in.; width or diam. 24-60 in.; length, 72-240 in., mill finish.

Alloy	Plate Base	Circle Base
1100, 3003-F	44.60	50.90
5050-F	45.70	50.50
3004-F	46.70	52.40
5052-F	47.30	53.10
6061-T6	47.80	53.90
2024-T4*	51.80	58.90
7075-T6*	60.50	67.90

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 base, 12 ft lengths.

Diam (in.)*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	74.90	77.30	....	....
0.188	63.20	63.20	....	80.10
0.250	60.00	62.60	72.70	74.10
0.375	59.20	63.80	71.00	72.00
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	59.20	63.80	71.00	72.00
0.625	59.20	63.80	67.80	67.90
0.750	57.70	62.00	61.60	63.30
0.875	57.70	62.00	61.60	63.80
1.000	57.70	62.00	61.60	63.80
1.125	55.30	59.50	59.50	61.50
1.250	55.30	59.50	59.50	61.50
1.375	55.30	59.50	59.50	61.50
1.500	55.30	59.50	59.50	61.50
1.625	53.00	56.70	....	59.30
1.750	53.00	56.70	58.30	59.30
1.875	53.00	56.70	....	59.30
2.000	53.00	56.70	58.30	59.30
2.250	51.50	55.00	....	59.30
2.500	51.50	55.00	....	59.30
2.750	49.90	53.20	....	59.30
3.000	49.00	53.20	....	59.30
3.250	...	53.20	....	....
3.375	....	53.20	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random length, diam., 0.375-8 in., "F" temper; 2014, 47.50-57.60; 6061, 43.50-57.60; 7075, 61.80-71.90; 7079, 66.80-76.90.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 32.00; 1¼ in., 43.40; 1½ in., 51.80; 2 in., 62.60; 3 in., 124.95; 4 in., 171.80; 5 in., 233.15; 6 in., 308.55; 8 in., 464.35; 10 in., 716.25 (3-24 ft lengths).

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	45.30-46.80	54.00-60.00
15-17	45.30-46.80	56.50-61.80
18-23	45.80-47.50	58.60-67.00
24-32	45.80-47.50	66.80-81.50
33-38	49.50-52.20	85.10-96.60
39-44	59.80-63.60	102.00-124.00

MAGNESIUM

Sheets and Plates: AZ31B standard grades, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.00 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grades (AZ31B)
6-8	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 23.50-24.00; No. 2 heavy copper and wire, 22.75-23.25; light copper 20.00-20.50; No. 1 composition red brass, 20.50-21.00; No. 1

BRASS MILL PRICES

MILL PRODUCTS a

	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes
Copper	56.13b	50.36-51.36	....	57.32
Yellow Brass	49.27	35.77c	49.56	53.43
Low Brass, 80%	52.15	52.09	52.44	56.21
Red Brass, 85%	53.17	53.11	53.46	57.23
Com. Bronze, 90%	54.73	54.67	55.02	58.54
Manganese Bronze	57.69	51.27	61.54	....
Muntz Metal	51.94	47.25	....	....
Naval Brass	53.94	47.75	60.25	58.10
Silicon Bronze	61.39	60.58	60.68	79.80
Nickel Silver, 10%	65.56	67.16	66.91	....
Phos. Bronze, A-5%	76.97	77.47	76.72	78.90

SCRAP ALLOWANCES d (Based on copper at 31.00c)

	Clean Heavy	Rod Ends	Clean Turnings
Copper	27.00	27.00	26.25
Yellow Brass	20.375	19.50c	18.50c
Low Brass, 80%	22.875	22.625	22.125
Red Brass, 85%	23.875	23.625	23.125
Com. Bronze, 90%	24.75	24.50	24.00
Manganese Bronze	19.25	19.00	18.50
Muntz Metal	19.125	18.875	18.375
Naval Brass	19.00	18.75	18.25
Silicon Bronze	26.50	26.25	25.75
Nickel Silver, 10%	26.00	25.75	13.00
Phos. Bronze, A-5%	28.50	28.25	27.25

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Free cutting. d. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time of any or all kinds of scrap, add 1 cent per lb.

composition turnings, 19.50-20.00; new brass clipping, 18.00-18.50; light brass, 15.00-15.50; heavy yellow brass, 15.00-15.50; new brass rod ends, 17.00-17.50; auto radiators, unsweated, 16.50-17.00; cocks and faucets, 17.25-17.75; brass pipe, 17.50-18.00.

Lead: Soft scrap lead, 7.25-7.50; battery plates, 3.00-3.25; linotype and stereotype, 8.50-8.75; electrotype, 8.00-8.25; mixed babbitt, 10.00-10.50.

Monel: Clippings, 26.00-26.50; old sheets, 25.00-25.50; turnings, 18.50-19.00; rods, 25.00-25.50.

Nickel: Sheets and clips, 56.00-58.00; rolled anodes, 56.00-58.00; turnings, 43.00; rod ends, 56.00-58.00.

Zinc: Old zinc, 3.00-3.25; new diecast scrap, 3.00-3.50; old diecast scrap, 1.75-2.00.

Aluminum: Old castings and sheets, 8.50-9.00; clean borings and turnings, 4.00-4.50; segregated low copper clips, 10.75-11.25; segregated high copper clips, 9.75-10.25; mixed low copper clips, 10.25-10.75; mixed high copper clips, 9.75-10.25.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 9.50-10.00; clean borings and turnings, 7.00-7.50; segregated low copper clips, 14.50-15.00; segregated high copper clips, 13.00-13.50; mixed low copper clips, 12.50-13.00; mixed high copper clips, 12.00-12.50.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 10.50; clean borings and turnings, 8.50-9.00; segregated low copper clips, 13.50; segregated high copper clips, 13.00; mixed low copper clips, 13.00; mixed high copper clips, 12.50-13.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 57.00; light scrap, 52.00; turnings and borings, 37.00.

Copper and Brass: No. 1 heavy copper and wire, 28.25; No. 2 heavy copper and wire, 26.00; light copper, 23.75; refinery brass (60% copper) dry copper content, 24.75.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 28.00; No. 2 heavy copper and wire, 26.00; light copper, 23.75; No. 1 composition borings, 22.50; No. 1 composition solids, 23.00; heavy yellow brass solids, 18.50; yellow brass turnings, 17.50; radiators, 19.00.

Plating Material

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.60.

Copper: Flat-rolled, 47.50; oval, 44.50; electrodeposited, 37.50; cast, 42.50; 5000-10,000 lb quantities.

Nickel: Depolarized, less than 500 lb, 117.50; 500-1999 lb, 110.50; 2000-4999 lb, 107.00; 5000-29,999 lb, 106.00; 30,000 lb, 105.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 135.50; 200-499 lb, 134.00; 500-999 lb, 133.50; 1000 lb or more, 133.00.

Zinc: Balls, 18.25; flat tops, 18.25; flats, 21.00; ovals, 20.25, ton lots.

CHEMICALS

Cadmium Oxide: $1.60 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,000 lb, 61.90.

Copper Sulphate: 100-1900 lb, 15.50; 2000-5900 lb, 13.50; 6000-11,900 lb, 13.25; 12,000-22,900 lb, 13.00; 23,000 lb or more, 12.50.

Nickel-Chloride: 100 lb, 47.50; 200 lb, 45.50; 300 lb, 44.50; 400-4900 lb, 42.50; 500-9900 lb, 40.50; 10,000 lb or more, 39.50.

Nickel Sulphate: 5000-22,999 lb, 31.00; 23,000-39,900 lb, 30.50; 40,000 lb or more, 30.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-900 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 86.90; 100-600 lb, 77.20; 700-1900 lb, 74.50; 2000-9900 lb, 72.60; 10,000 lb or more, 71.30.

Stannous Chloride (Anhydrous): 100 lb, 145.40; 400 lb, 135.40; 800-19,900 lb, 114.10; 20,000 lb or more, 109.90.

Stannous Sulphate: Less than 50 lb, 152.80; 50 lb, 122.80; 100-1900 lb, 120.80; 2000 lb or more, 118.80.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

ceived from other leading producers.

U. S.-Canadian oil drilling climbed to a new high for the year in the week ended July 24. Hughes Tool Co., Houston, reports 1998 rotary rigs at work in the two countries. The count is up 20 wells from the previous week. Gains in Texas and Oklahoma helped boost the total.

New orders for about 400 miles of 12 in. line pipe for oil pipelines have been announced by Page-Hersey Tubes Ltd., Toronto, Ont. The orders have been received from Western Pacific Products & Crude Oil Pipe Lines Ltd., Vancouver, B. C.; Peace River Oil Pipe Co. Ltd., Calgary, Alta.; and Interprovincial Pipe Line Co., Toronto, Ont.

Epps Industries Inc., Los Angeles, has placed a second welded steel tube mill (McKay) in operation. It handles diameters ranging $\frac{3}{8}$ to 2.5 in.

Armco Enlarges Facilities At Houston Plate Mill

Early this fall, Sheffield Div., Armco Steel Corp., will start operating its production line at the Houston plant for heat treating high strength, alloy steel plates up to 144 in. wide. The continuous plate hardening-quenching-tempering line will substantially augment the plant's equipment for heat treating round bars and 76 in. wide plates of high strength alloy steel.

The new heat treating production equipment has also been designed to handle the wider and heavier plates which will be rolled in the Houston plant's new, 160 in., slab-and-plate mill which will be completed next year.

With this and other installations at the Houston plant, Sheffield will be capable of producing heat treated, carbon and alloy steel plates ranging from 0.25 to 4 in. in thickness and up to 10 tons in weight.

"We will be able to produce heat treated, alloy plates in finished sizes up to 144 in. wide, 2 in. thick, and 45 ft long, at a maximum rate of 18 tons an hour," says K. P. Campbell, works manager, Houston plant.

Plates . . .

Plate Prices, Page 104

Plate demand is still drifting. Specialties are moving well, but sheared and universal plate specifications lag. Deliveries of universal plates range ten days to two weeks (in a few cases, three weeks).

Alan Wood Steel Co., Conshohocken, Pa., will end production on its 84 in. plate mill Aug. 10 and will start rolling on its new 110 in. mill Aug. 28. It will roll plates up to 4 in. thick—$\frac{3}{4}$ in was the limit of the mill it is replacing.

Plate shops in New England are estimating slightly heavier subcontract volume, mostly for shipyard. Weldment tonnage is showing signs of improvement, but mill orders are slack. Small tank volume is holding somewhat above earlier expectations, notably government installations. High tensile alloy shipments range five weeks and under.

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One Wheelabrator Cabinet, including (3) type 17-M-150 Wheelabrator units. Replaceable Long-Lyfe liners, and automatic abrasive reclaiming devices. Size #4 dust collector equipment, including all electrical equipment, motor, controls, etc. 2½ years old, like new. **Reply Box 952, STEEL, Penton Bldg., Cleveland 13, Ohio.**

One Verson Straight Side Press—#HS2—250 ton—54 x 36 "T" double crank action single gear single drive high speed press. Stroke 6"—strokes per minute through vari-drive 50 to 100; automatic lubrication system; pneumatic die cushion. Three years old, like new. **Reply Box 953, STEEL, Penton Bldg., Cleveland 13, Ohio.**

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FACTORY SUPERINTENDENT - MANAGER — Fully familiar with all phases of sheet metal and plate products manufacturing—methods welding, tools, dies, plant layout. Maintenance. labor relations—costs on both job shop and mass produced items—water heaters—metal furniture—also chemical and other process equipment—all metals. Reply Box No. 951, STEEL, Penton Bldg., Cleveland 13, Ohio.

Metal Can Shipments Rise

Metal can shipments during the first five months of this year showed a 2.8 per cent increase over the comparable 1960 period, reports the Can Manufacturers Institute, New York. During the five month period, 37,690 tons of steel were consumed for cans for soft drinks, 55.9 per cent more than a year ago. Shipments of cans for vegetables and vegetable juices during the period registered a 19.9 per cent increase over 1960.

Shipments of aluminum cans reached 15,628 tons during the five month period, 90.9 per cent more than a year ago. Shipments of cans for pressure packed products increased 8.2 per cent.

Steel Product Imports Exceed Exports in May

Imports of steel products exceeded exports by almost 100,000 tons in May. Imports totaled 280,982 tons (265,653, steel mill products; 15,239, other steel products) compared with 290,921 tons in the like month a year ago, reports the American Iron & Steel Institute. Total imports for the first five months came to 1,079,735 tons compared with 2,108,096 tons for the like 1960 period.

Imports of iron products and ferroalloys amounted to 37,353 tons in May, 1961, and 25,884 tons in May, 1960. This brought the total for the first five months to 118,917 tons this year against 132,874 tons a year ago.

Leading import items on a tonnage basis in May were: Concrete reinforcing bars (58,106), wire rods (37,347), welded steel pipe and tubing (36,845), plain structural shapes, 3 in. and over (25,670), wire nails (21,885), and bar shapes, under 3 in. (21,403).

Steel products exports in May totaled 183,599 tons (158,660, steel mill products; 24,939, other steel products) compared with 339,301 tons in May, 1960. Total exports in the first five months came to 840,004 tons this year compared with 1,191,054 tons a year ago.

Exports of iron products and ferroalloys amounted to 45,526 tons in May of this year, 14,010 tons in May, 1960, and 233,983 tons in the first five months of this year aaginst 62,874 tons in the like period a year ago.

Principal items exported in May included: Unfabricated structural shapes (18,979 tons), hot dipped and electrolytic tin plate (17,170 tons), tin plate, seconds (17,005 tons), and cold rolled sheets (14,564 tons).

Shipments of Steel Products—May, 1961

(Net tons)

Products	Carbon	Alloy	Stainless	First Five Months 1961	First Five Months 1960
Ingots	10,727	8,540	260	90,445	186,333
Blooms, etc.	66,566	35,283	2,420	417,797	793,429
Tube Rounds	1,641	458	.....	7,001	10,158
Skelp	5,793	.....	.....	51,937	76,765
Wire Rods	82,558	2,180	561	345,738	499,855
Structurals	389,441	3,033	8	1,689,044	2,546,060
Steel Piling	44,121	.....	.....	136,805	188,381
Plates	447,109	37,351	3,549	2,207,903	3,394,047
Rails—Standard	43,955	.....	.....	199,566	438,588
Rails—Other	3,058	.....	.....	20,432	23,460
Joint Bars	2,132	.....	.....	7,767	16,148
Tie Plates	10,970	.....	.....	37,049	71,578
Track Spikes	3,844	.....	.....	14,762	25,676
Wheels	16,382	133	.....	70,379	124,263
Axles	3,537	48	.....	22,737	62,032
Bars—Hot Rolled	447,769	120,834	3,837	2,353,351	3,826,399
Bars—Reinforcing	220,111	.....	.....	928,328	827,075
Bars—Cold Finished	83,352	16,289	5,137	446,127	777,686
Tool Steel	516	5,789	.....	30,720	45,917
Standard Pipe	185,288	310	.....	800,258	1,072,876
Oil Country Goods	95,530	23,680	.....	547,698	672,753
Line Pipe	255,662	479	.....	962,441	1,271,425
Mechanical Tubing	45,372	16,131	310	253,945	420,964
Pressure Tubing	18,856	3,884	1,313	105,613	122,366
Drawn Wire	225,013	2,909	1,994	926,450	1,180,642
Nails & Staples	33,227	.....	.....	140,557	153,941
Barbed Wire	9,360	.....	.....	37,234	23,325
Woven Fence	15,981	.....	.....	68,396	58,386
Bale Ties, etc.	12,806	.....	.....	30,833	28,366
Black Plate	48,872	.....	.....	220,912	282,653
Tin Plate—HD	27,845	.....	.....	123,903	174,536
Tin Plate—Electro	532,200	.....	.....	2,354,463	2,416,774
Sheets—HR	638,267	17,925	1,296	2,600,079	4,366,105
Sheets—CR	1,109,892	3,686	12,193	4,468,011	7,381,995
Sheets—Galvanized	297,124	.....	.....	1,201,021	1,525,706
Sheets—Other	19,799	.....	.....	81,996	130,030
Elec. Sheets—Strip	1,996	45,570	.....	214,704	299,478
Strip—H.R.	105,626	1,813	496	426,128	713,467
Strip—CR	88,972	1,266	15,456	456,603	711,916
Total (1961)	5,651,270	347,591	48,830	25,099,133	.....
Total (1960)	5,880,884	344,183	47,365	.....	36,941,554

Data from American Iron & Steel Institute.

Ford Boosting Foundry Capacity 10 Per Cent

Installation of three new cupolas (90 ft high) at Ford Motor Co.'s foundry in Brook Park (Cleveland), Ohio, will increase melting capacity of the plant by 10 per cent and substantially reduce production costs, says E. E. Harkess, plant manager.

The new cupolas replace six older units as part of a modernization program, which includes a recently completed air pollution control system. Two of the cupolas have been assembled, and the third will be in operation this month.

Hourly capacity of the new cupolas will be about 35 tons of iron melt compared with a 30 ton rate for the older ones. Preparation time for melting will be less than with refractory lined cupolas. In addition, melts will be more uniform, and cupola tenders will be able to exercise more precise control. Each of the new cupolas will have its own hot blast unit, a key to greater operational efficiency, says Mr. Harkess.

Structural Shapes . . .

Structural Shape Prices, Page 104

Buying of structural steel by the construction industry is disappointing. The volume of work up for figuring is substantial, but fabricators are not booking orders at the rate they did a few weeks ago. Fabricated steel prices continue to be weak. Labor disturbances continue to hurt construction in the New York metropolitan area.

In New England, tonnage of unplaced, but estimated, fabricated structural steel is backing up. That may cause late completion dates, although most of the volume is wide flanged and stringer work. Shopwork on it is limited. Builders are bearing down hard on steel prices in place. Unplaced tonnage of H-bearing piles is unusually heavy.

The $75 million Madison Square

Garden Center over the Pennsylvania Station in New York will require 25,000 to 30,000 tons of structural steel. The Garden can be converted into what is claimed to be the largest convention hall in the world. Describing the major sports arena, the architect, Charles Luckman, says it will be "the first use of a compression ring in such a large structure—an architectural structural system formed by steel cables embedded in concrete." It will provide an unobstructed view from all 25,000 seats.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

500 tons, Pennsylvania Avenue interchange, Washington, to Atlas Machine & Iron Works, Arlington, Va.

315 tons, addition No. 5, Armstrong Cork Co., Lancaster, Pa., to A. B. Lote Co., that city.

160 tons, state bridge work, Venango-Mercer-Crawford Counties, Pennsylvania, to Bethlehem Steel Co., Bethlehem, Pa.

STRUCTURAL STEEL PENDING

25,000 to 30,000 tons, $75 million Madison Square Garden Center over Pennsylvania Station, New York; structural bids to be asked in six to eight months; project to be completed in 1964. A heavy tonnage of reinforcing steel will also be required; a joint venture, Graham-Paige Corp., owner of present Madison Square Garden, will have 75 per cent interest and the Pennsylvania Railroad 25 per cent; Charles Luckman Associates, architects.

In addition to a major sports arena, seating 25,000, and an auxiliary arena seating 4000, the project will include a 34-story commercial building (the first 12 stories to provide parking space for 3000 cars); and a 28-story, 750 room hotel, which will be of concrete construction; the office building will require about 15,000 tons of structural steel.

15,000 tons, Beacon-Newburgh bridge superstructure, New York State Bridge Authority, Newburgh, N. Y.; Bethlehem Steel Co., Bethlehem, Pa., low bidder.

4800 tons, Roosevelt Bridge, Washington; McCloskey & Co., Philadelphia, low on general contract.

1281 tons, state education building, Trenton, N. J.; Keystone Structural Steel Co., that city, low bidder.

969 tons, state bridge work, Cumberland County, Pennsylvania; bids Aug. 25.

310 tons, Hy-80 light sections, Navy Purchasing Office, Washington; bids Aug. 14.

REINFORCING BARS . . .

REINFORCING BARS PENDING

3000 tons, spillway structure, Big Bend Reservoir project; bids Oct. 10, U. S. Engineer, Omaha, Nebr.

785 tons, yards and docks, Purchasing Div., Navy, Port Hueneme, Calif.; bids Aug. 17.

600 tons, state bridge work, Cumberland County, Pennsylvania; bids Aug. 25.

333 tons, bridge and drainage structures, Interstate Route 84 and East Hartford, Conn., highway; bids Aug. 14, Hartford, Conn.

RAILS, CARS . . .

RAILROAD CARS PLACED

Southern Railways, 200 boxcars, to Pullman-Standard Div., Pullman Inc., Chicago.

Southern Pacific, 100, piggyback flatcars, to General American Transportation Corp., Chicago, and 50 flatcars, to the Johnstown, Pa., plant of Bethlehem Steel Co., Bethlehem, Pa., and 25 baggage cars, to Pacific Car & Foundry Co., Renton, Wash.

Trailer Train, 69, trailer flatcars, to Johnstown, Pa., plant of Bethlehem Steel Co., Bethlehem, Pa.

Canadian National, 40, seventy ton, steel covered hopper cars, 25, double deck flatcars, and 10, aluminum covered tank cars, to the Montreal Locomotive Works, Montreal, Que.

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Coming Aug. 14 IN STEEL

Reliability: Profit Cornerstone

Spending for reliability is an investment for profit growth. Check STEEL next week for the tools and techniques that will help you set up a profitable reliability program.

This will be the sixteenth installment in a 25-part series that will run for the rest of the year. For a free copy of any or all articles in the program (appearing biweekly since Jan. 16), write: Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Local Business Scores Again! On this, our Twentieth Anniversary, we salute the energy and foresight of thousands of businessmen and executives in every part of the land for their continuing support of the Payroll Savings Plan for U.S. Savings Bonds. For twenty years, they have seen the Payroll Savings Plan pay off in more local buying power. They've seen it help create more efficient and confident employees. They've seen it as a hard-to-beat employee benefit program. They've seen it improve labor relations and cut employee turnover. They've seen it strengthen the economic sinews of the nation.

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FIRST ALL-NEW FACILITY FOR THIN TIN PLATE

Wean will build cleaning line for Weirton Steel's expansion

Weirton Steel Division of National Steel Corporation will expand its supply of thin tin plate product for the container market by 300%—marking the first installation of processing equipment specifically designed to treat thin tin plate. The new, high-speed Wean line incorporated in this expansion will clean, chemically treat and oil the light-weight tin plate, which can be shipped to container manufacturers at reduced shipping charges and lower initial cost.

Weirton Steel will be able to handle 60,000 lb. coils on this new line, processing the thin tin plate at speeds up to 2200 fpm. Other features of the line include precision tension control, balanced rolls, and rigid design to assure uniform strip tracking.

This pioneer installation designed specifically for thin tin plate is only one example of Wean's experience in this field. Over 80% of the world's supply of *all* tin plate is produced on Wean equipment—as is the thin tin plate processed by eight of the nine current producers. This unique background of engineering "know-how" can help you in planning your requirements.

THE WEAN ENGINEERING COMPANY, INC. · WARREN, OHIO

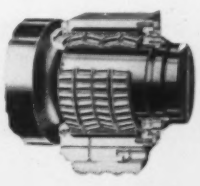
WEAN

Bearing down on costs in BLAW-KNOX hot strip mill

When Blaw-Knox built this 56-inch semi-continuous hot strip mill, they wanted to be sure it would roll silicon, high alloy, carbon and stainless steels at the lowest possible operating cost per ton. They made sure by mounting back-up rolls on modern Timken® tapered roller bearings. Operating cost savings have been proved by actual case studies on hot strip mills in the steel industry. Timken bearings use low cost grease lubrication. Modern Timken balanced proportioned bearings in back-up roll positions on new mills are being designed to provide: 1) 10% roll turn down, 2) Roll neck diameters which are 70% of the minimum roll barrel diameter, 3) Normal roll neck stresses of 8,500 pounds per square inch.

Timken back-up roll bearings eliminate costly mill downtime due to damaged bearings and failure of the lubrication system. Because they virtually eliminate friction, mills start up easier, bearings and rolls last longer. For the most in bearing performance and engineering service when you buy or build a mill, specify Timken bearings.

The Timken Roller Bearing Company, Canton 6, Ohio. Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits. Canadian Division: Canadian Timken, St. Thomas, Ontario.



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